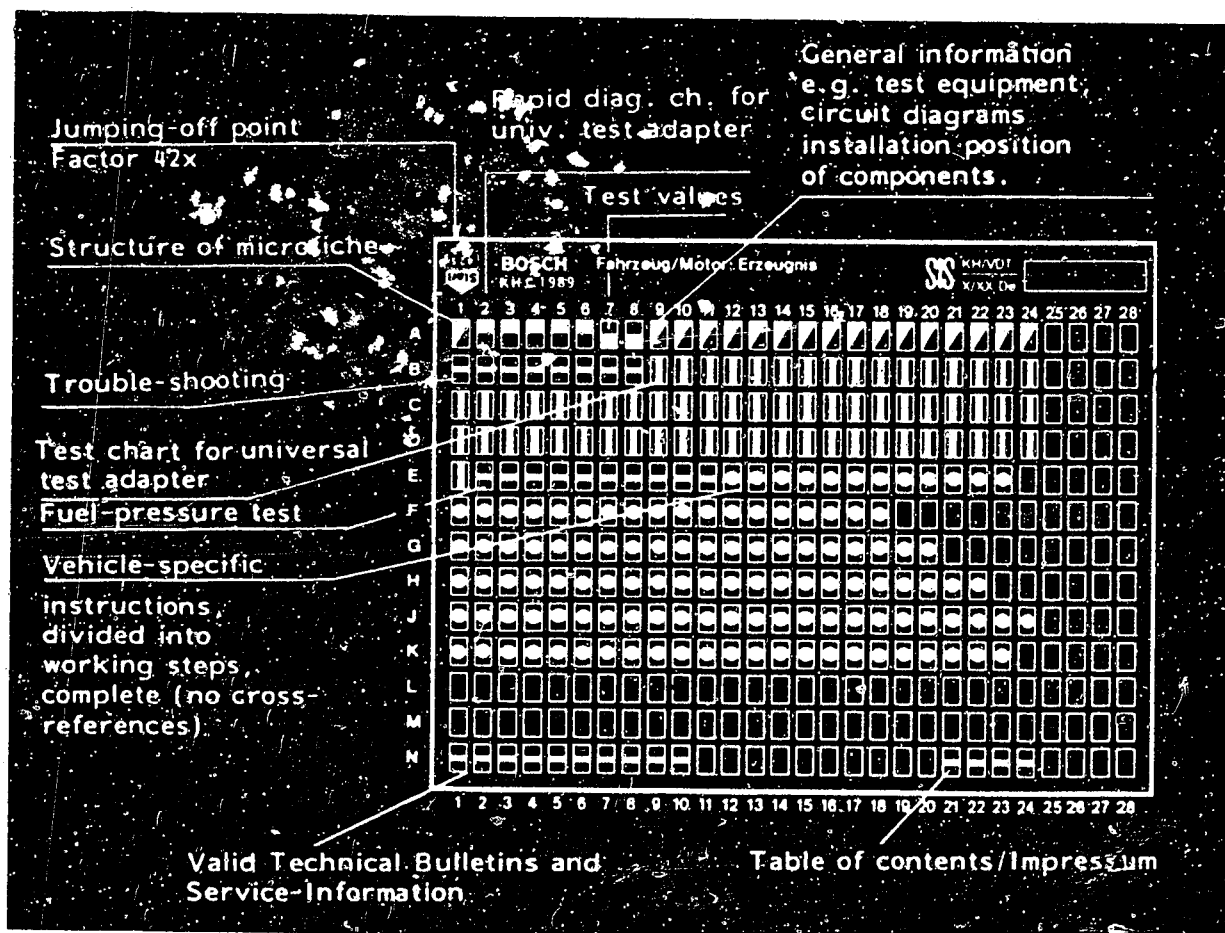


Structure of microfiche

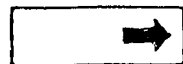


1. Read from left to right
2. Title of microfiche (appears on each coordinate)

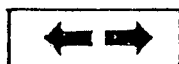
E16	Product/component/test step
	Vehicle/engine

Coordinate

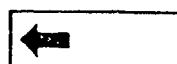
3. Limits of section



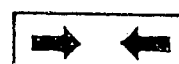
Beginning



Mid-section



End



One-page section

4. Purely vehicle-specific passages in the text are marked with a vertical bar.

5. Reference to relevant working steps in the test specifications, e.g. coordinate C6.

C6

A1	Trouble-shooting chart	
-----------	------------------------	--

Rapid diagnosis chart for universal test adapter

The following rapid diagnosis chart makes it possible for the experienced L-Jetronic expert to quickly check the electrical part of the system using the universal test adapter.

The rapid diagnosis chart contains the following information:

- Switch positions on the universal test adapter
- Sequence of test steps
- Notes on how to operate the universal test adapter or other components
- Readings on the multimeter
- References to coordinates of the relevant detailed testing and trouble-shooting program.

If detailed information and instructions are necessary, always proceed according to the trouble-shooting program starting on Coordinate B1/B2.



Rapid diagnosis chart for universal test adapter

<u>Test step</u>	<u>Switch position</u>		<u>Remarks</u>	<u>Test specifications (reading)</u>	<u>See Coordinate for trouble-shooting</u>
	V	Ω			
1	3	-	Shift gear to neutral. Operate starting motor. Measure voltage.	<u>8 ... 15 V</u>	B 11
2	4	-	Test step 2 need not be performed with water-heated auxiliary-air device. Shift gear to neutral. Operate starting motor. Measure voltage.	<u>8 ... 15 V</u>	B 15
3	5	-	Shift gear to neutral. Operate starting motor. Measure voltage pulses with motortester.	Ignition pulses	B 19
4	6	-	Ignition "ON". Measure voltage	<u>8 ... 15 V</u>	B 21
5	7	-	Ignition "ON". Measure voltage	<u>8 ... 15 V</u>	B 23
6	8	-	Ignition "ON". Measure voltage	<u>8 ... 15 V</u>	C 3
7	9	-	Ignition "ON". Measure voltage	<u>8 ... 15 V</u>	C 7
8	10	-	Ignition "ON". Measure voltage	<u>8 ... 15 V</u>	C 11
9	11	-	Ignition "ON". Measure voltage. Deflect air-flow sensor flap	<u>8 ... 15 V</u>	C 15
10	12	-	Ignition "ON". Measure voltage	<u>8 ... 15 V</u>	C 19
11	13	-	Ignition "ON". Measure voltage	<u>8 ... 15 V</u>	C 21
12	14	-	Ignition "ON". Measure voltage	<u>8 ... 15 V</u>	D 1

A3

Rapid diag. chart for univ. test adapter
BMW 5, 6 and 7 series













A4

Rapid diag. chart for univ. test adapter
BMW 5, 6 and 7 series



Rapid diagnosis chart for universal test adapter

<u>Test step</u>	<u>Switch position</u>		<u>Remarks</u>	Test specifications (reading)	<u>See Coordinate for trouble-shooting</u>
	V	Ω			
13		6	Measure resistance. Deflect air-flow sensor flap. 1) As of FD 049	$\frac{40 \dots 300 \Omega}{80 \dots 600 \Omega}$ 1)	D 5
14		7	Measure resistance. 1) As of FD 049	$\frac{130 \dots 260 \Omega}{260 \dots 520 \Omega}$ 1)	D 7
15		8	Measure resistance. 1) As of FD 049	$\frac{200 \dots 400 \Omega}{400 \dots 800 \Omega}$ 1)	D 9
16		9	Measure resistance. Accelerator in rest position: Depress accelerator pedal somewhat:	$\frac{0 \dots 10 \Omega}{\infty \Omega}$	D 11
17		10	Measure resistance. Accelerator in rest position: Depress accelerator pedal completely:	$\frac{\infty \Omega}{0 \dots 10 \Omega}$	D 13
18		11	Measure resistance. +15 ... 30°C:	$\frac{1,45 \dots 3,3 \text{ k}\Omega}{250 \dots 390 \Omega}$	D 15
19		12	Measure resistance. +15 ... 30°C: approx.+80°C:	$\frac{1,3 \dots 3,6 \text{ k}\Omega}{250 \dots 390 \Omega}$	D 17
20		13	Measure resistance.	$\frac{0 \dots 10 \Omega}{0 \dots 10 \Omega}$	D 19
21		14	Measure resistance.	$\frac{0 \dots 10 \Omega}{0 \dots 10 \Omega}$	D 21
22		15	Measure resistance.	$\frac{0 \dots 10 \Omega}{0 \dots 10 \Omega}$	D 23

A5

Rapid diag. chart for univ. test adapter
BMW 5, 6 and 7 series



A6

Rapid diag. chart for univ. test adapter
BMW 5, 6 and 7 series



Air-flow sensor

Resistance between term. 7 and
term. 8: 100 ... 500 Ω
(With air-flow sensor
flap deflected)
As of FD 049: 200 ... 1000 Ω

B5

Relay set

Resistance measurement between term. 86b and term. 85
(Positive pole of ohmmeter)

Relay set 0 332 514 121: 70 ... 500 Ω

Relay set 0 332 514 105: 50 ... 110 Ω

Electrically heated auxiliary-air device (as of 8.79)

Internal resistance: 25 ... 60 Ω

B7

Idle speed

Manually-shifted and
automatic transmission: 850 ... 950 min⁻¹

Exhaust-gas setting

CO concentration with
engine at normal opera-
ting temperature: 0.5...2.0 % by vol. CO

Fuel pressure: with engine stopped: 2,3 ... 2,7 bar
with engine idling: approx. 0,5 bar less

Fuel pump delivery 2.8 l engine: min. 850 cm³/30 s
3.3 l engine: min. 900 cm³/30 s
3.5 l engine: min. 950 cm³/30 s
Supply voltage under load: min. 12 V

Solenoid-operated injection valve:

Internal resistance at +15°C...30°C: 2,0 ... 3,0 Ω

A7

Test specifications

BMW 5, 6 and 7 series



Temperature sensors

B7

	NTC I	NTC II
Ambient temperature (+15...30°C):	1.45...3.3 kΩ	1.30...3.6 kΩ
Engine at normal op. temp. (approx. +80°C):		250 ...390 Ω

<u>Thermo-time switch for 0 280 130 214:</u>	Electrical internal resistance:		
	"G" and ground	"W" and ground	"G" and "W"
Ambient tempera- ture (below +30°C):	25...40Ω	0Ω	25...40Ω
Engine at normal op. temp. (above +40°C):	50...80Ω	100...160Ω	50...80Ω

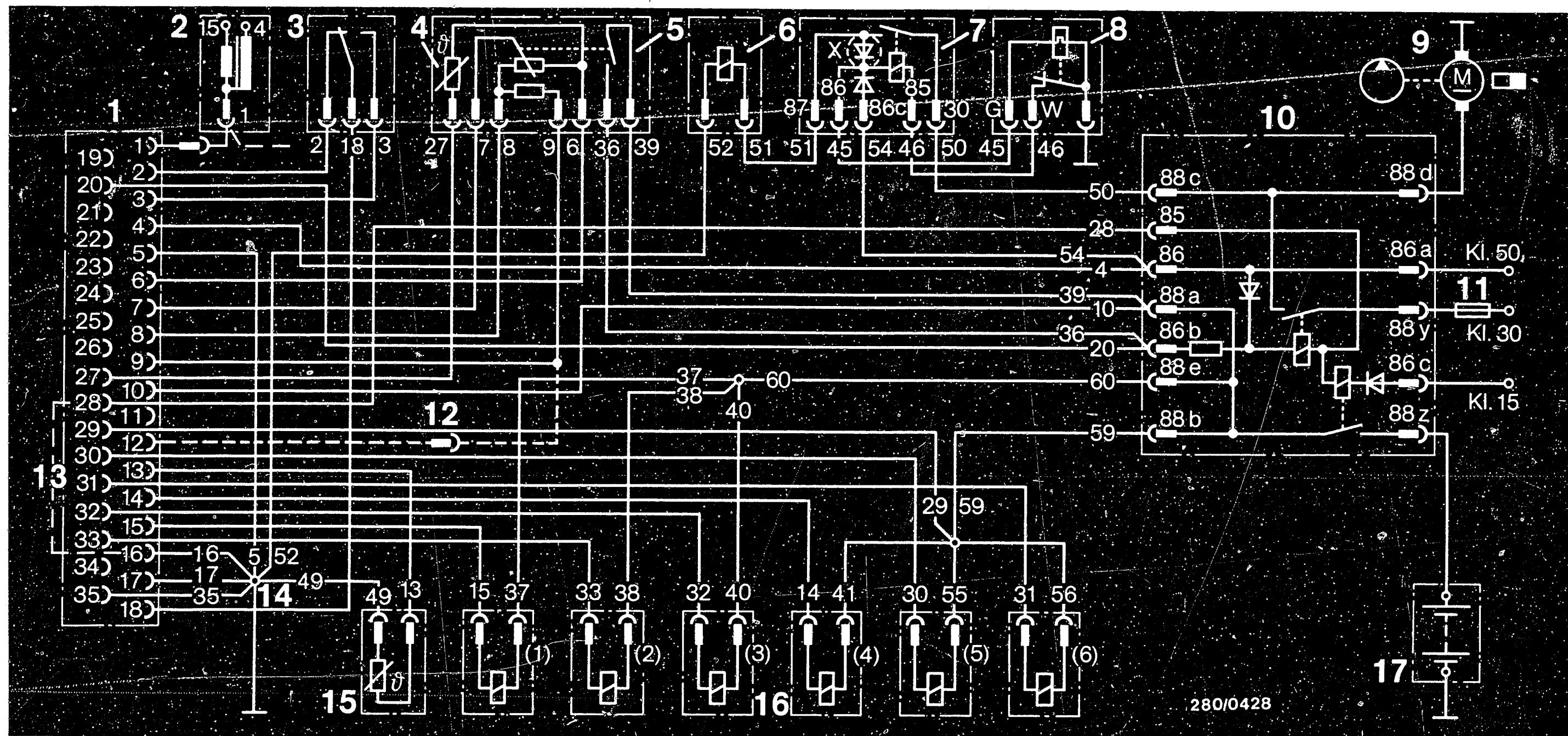
<u>for 0 280 130 219:</u>	"G" and ground	"W" and ground	"G" and "W"
Considerably below ambient tempera- ture (below +15°C):	50...70Ω	0Ω	50...70Ω
Ambient temperature (+15°C):	50...70Ω	∞Ω	∞Ω

See equipment and Autodata microfiches for settings for ignition, valve clearance and other engine data.

A8

Test specifications
BMW 5, 6 and 7 series

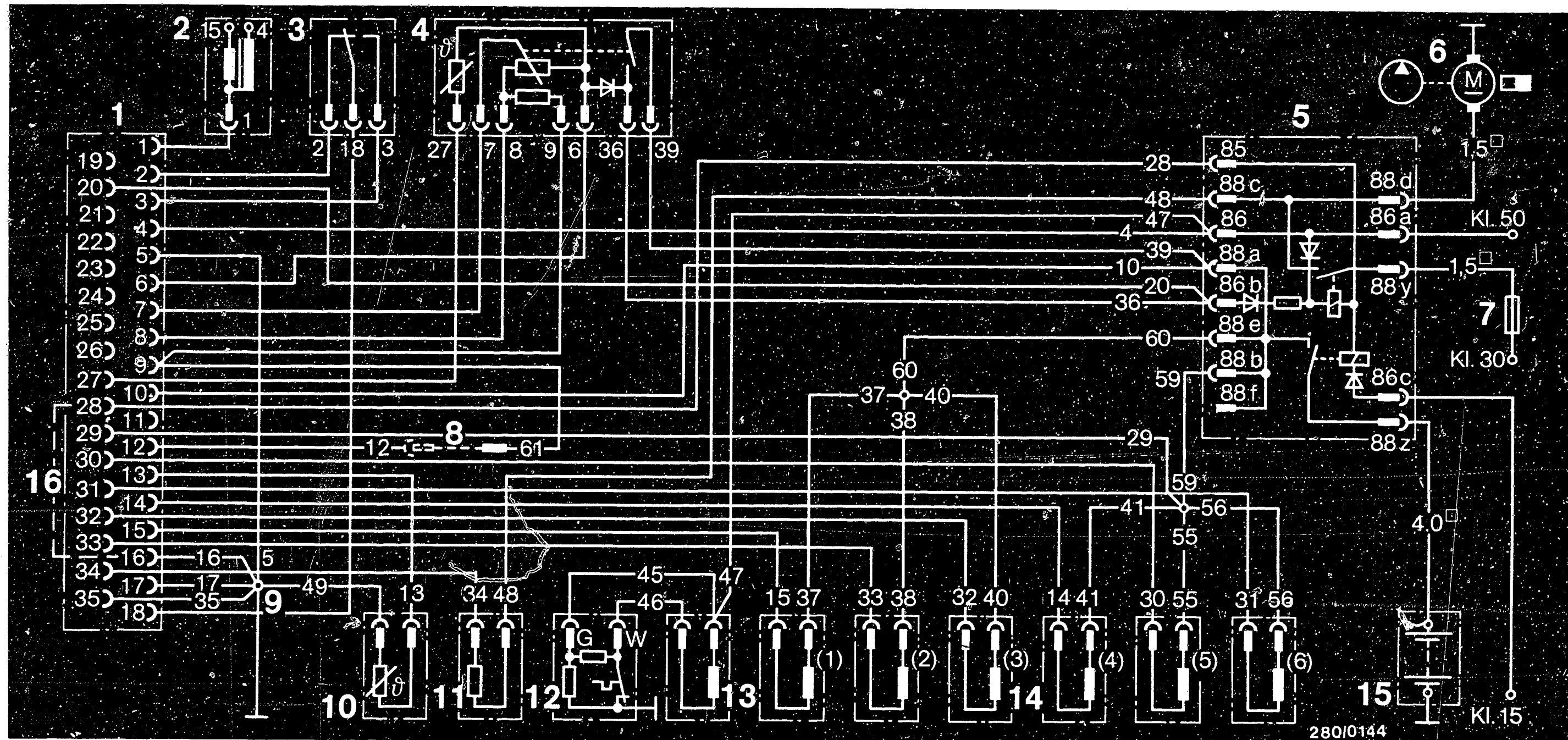




Electrical terminal diagram of L-Jetronic (BMW 5, 6 and 7 series up to 7.1979)

- | | | |
|--------------------------------|------------------------------------|-------------------------------------|
| 1 = Multiple plug | 8 = Thermo-time switch | 14 = Central ground |
| 2 = Ignition coil | 9 = Electric fuel pump | 15 = Temperature sensor II (engine) |
| 3 = Throttle-valve switch | 10 = Relay set | 16 = Injection valves |
| 4 = Temperature sensor I (air) | 11 = Fuel pump fuse | 17 = Battery |
| 5 = Air-flow sensor | 12 = Plug connector for adaptation | X = Not applicable as of April/ |
| 6 = Start valve | correction (must be plugged in on | May 79 |
| 7 = Post-start relay | 635CSi) | |
| | 13 = Bridge in control unit | |





Electrical terminal diagram of L-Jetronic (BMW 5, 6 and 7 series as of 8.1979)

1 = Multiple plug
 2 = Ignition coil
 3 = Throttle-valve switch
 4 = Air-flow sensor
 5 = Relay set

6 = Electric fuel pump
 7 = Pump fuse
 8 = Plug connector for adaptation
 (635CSi + 735i)
 9 = Central ground
 10 = Temperature sensor II (motor)

11 = Auxiliary-air device
 12 = Thermo-time switch
 13 = Start valve
 14 = Injection valves
 15 = Battery
 16 = Bridge in control unit

A11

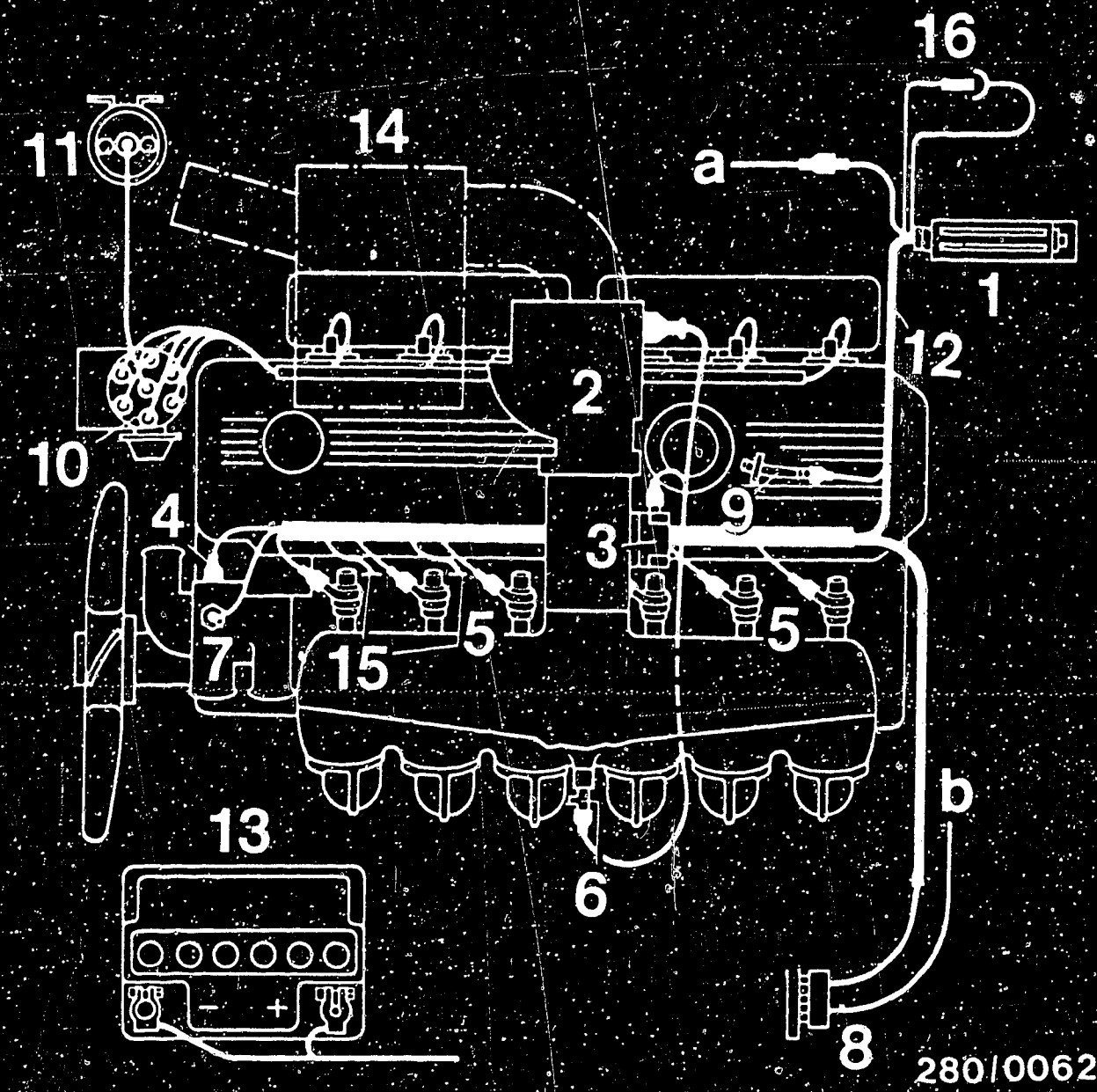
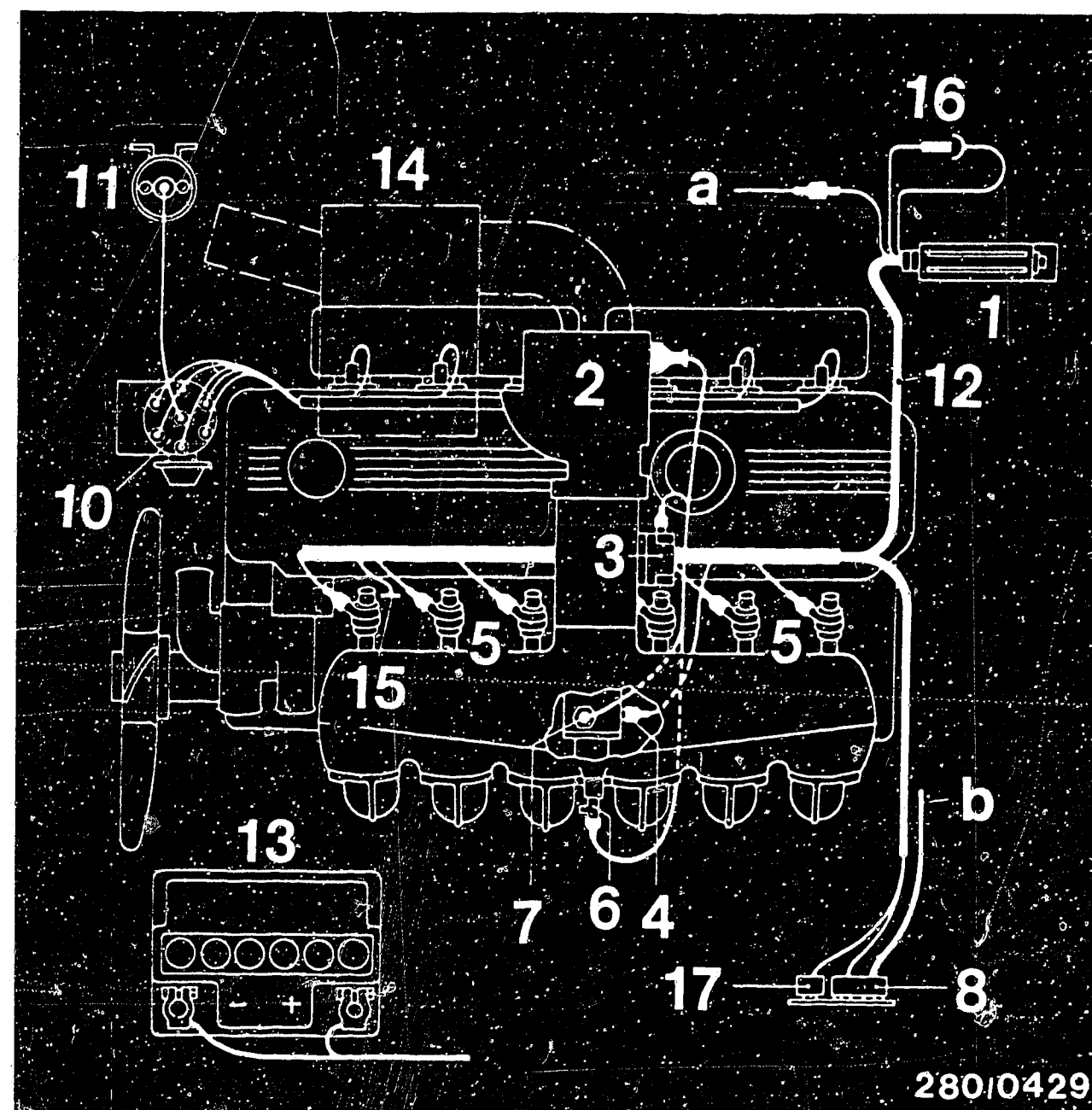
Electrical terminal diagram
 BMW 5, 6 and 7 series



A12

Electrical terminal diagram
 BMW 5, 6 and 7 series





Arrangement for BMW 5 and 6 series
up to 7.1979 (7 series similar)

Arrangement for BMW 5 and 6 series
as of 8.1979 (7 series similar)

Electrical wiring diagram of L-Jetronic and arrangement of individual components

- | | |
|---------------------------|------------------------------|
| 1 = Control unit | 8 = Relay set |
| 2 = Air-flow sensor | 9 = Auxiliary-air device |
| 3 = Throttle-valve switch | 10 = Ignition distributor |
| 4 = Temperature sensor | 11 = Ignition coil |
| 5 = Injection valves | 12 = Jetronic wiring harness |
| 6 = Start valve | 13 = Battery |
| 7 = Thermo-time switch | 14 = Air filter |

- 15 = Central ground
- 16 = Plug connector for adaptation correction (only on 635CSi and 735i)
- 17 = Post-start relay
- a = Ignition coil
- b = Vehicle wiring harness



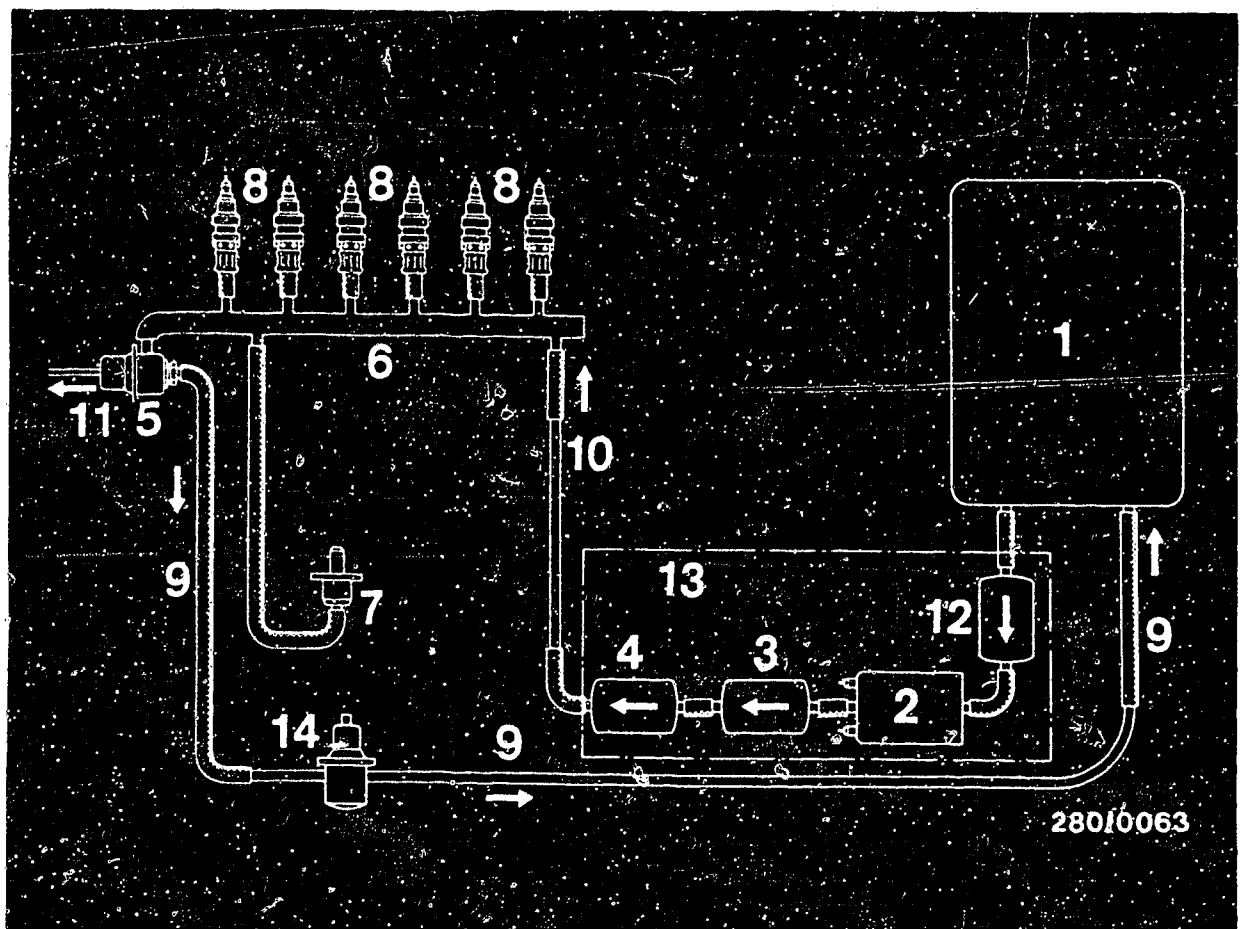


Diagram of fuel lines

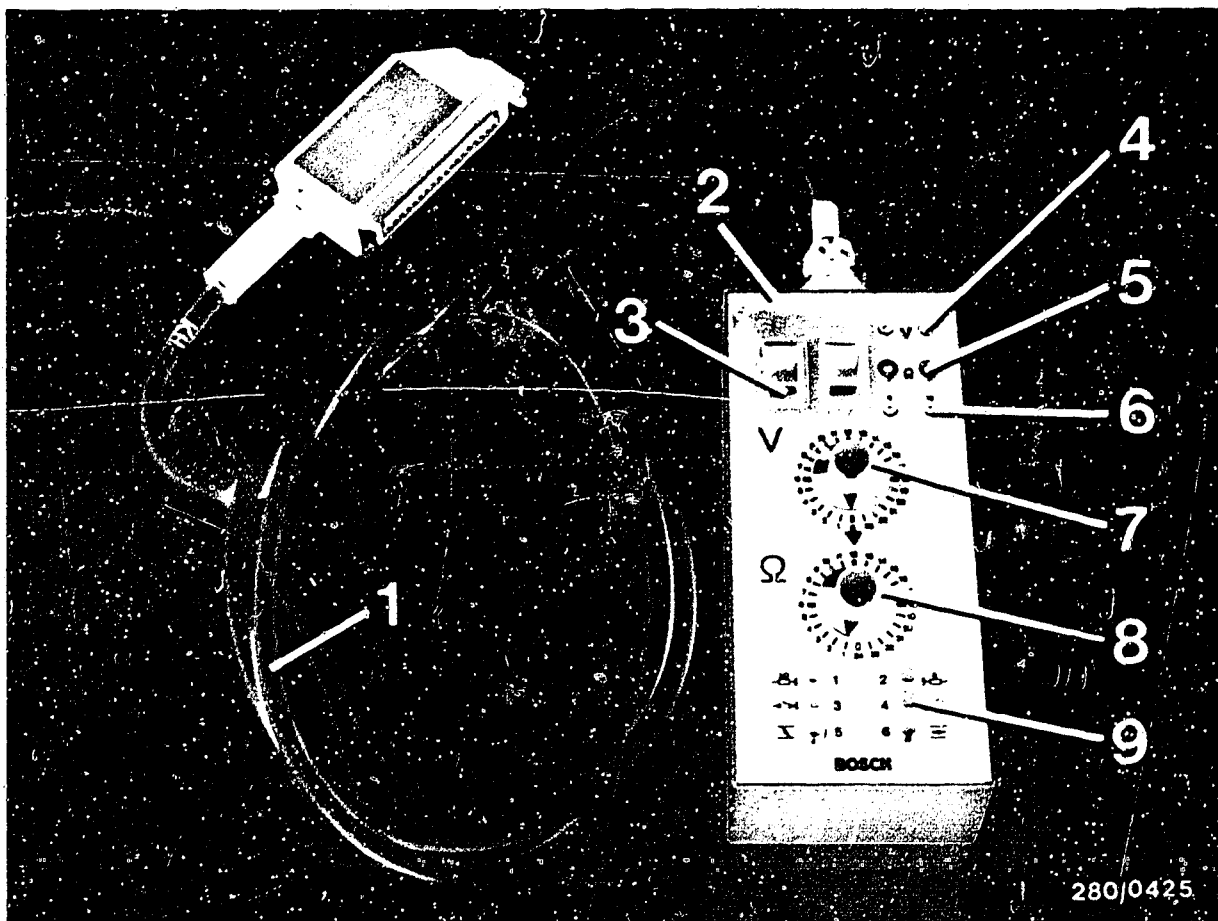
- 1 = Fuel tank
- 2 = Electric fuel pump (tube-type pump)
- 3 = Expansion vessel
- 4 = Fuel filter
- 5 = Pressure regulator
- 6 = Fuel-distribution pipe
- 7 = Start valve
- 8 = Solenoid-operated injection valve
- 9 = Fuel return line
- 10 = Fuel delivery line
- 11 = To intake manifold
- 12 = Fuel spinner (not on 635CSi, 728i, 528i)
- 13 = Mounting plate
- 14 = Fuel-line-pressure damper
(as of 10.80)

Test equipment and tools

Universal adapter	ETT 018.01	0 684 101 801
Adapter lead		1 684 463 129
Motortester	e.g. MOT 002.00	0 684 000 200
	MOT 300	0 684 000 300
	MOT 400	0 684 000 400
Exhaust-gas analyzer	e.g. ETT 008.00	0 684 100 800
Calibrated infrared exhaust-gas analyzers	ETT 008.04	0 684 100 804
	or ETT 008.05	0 684 100 805
Pressure gauge	Quality class 1.0 = 6 bar. 0.1 bar divisions	1 587 231 154
Three-way line		KDJE P-100/13
Test lead		1 684 463 093
Pressure tester		KDJE-P 100
or		
Pressure tester (no longer available)		KDEP 1034
Clamping fixture		1 688 120 093
Assembly mandrel		1 687 931 003
Parts set		1 287 010 701
Electrics tester	e.g. ETE 014.00	0 684 101 400
or multimeter	e.g. MDD 301	0 684 500 301
	e.g. Philips Co. PM 2517 X	
	e.g. Miselco Co. Master 50 K	
	e.g. Fluke Co. Multimeter 75 or 77	
Injection valve		0 280 150 152

Suitable, commercially available tools should be used for fitting and removing the idle CO anti-tamper device on the air-flow sensor.

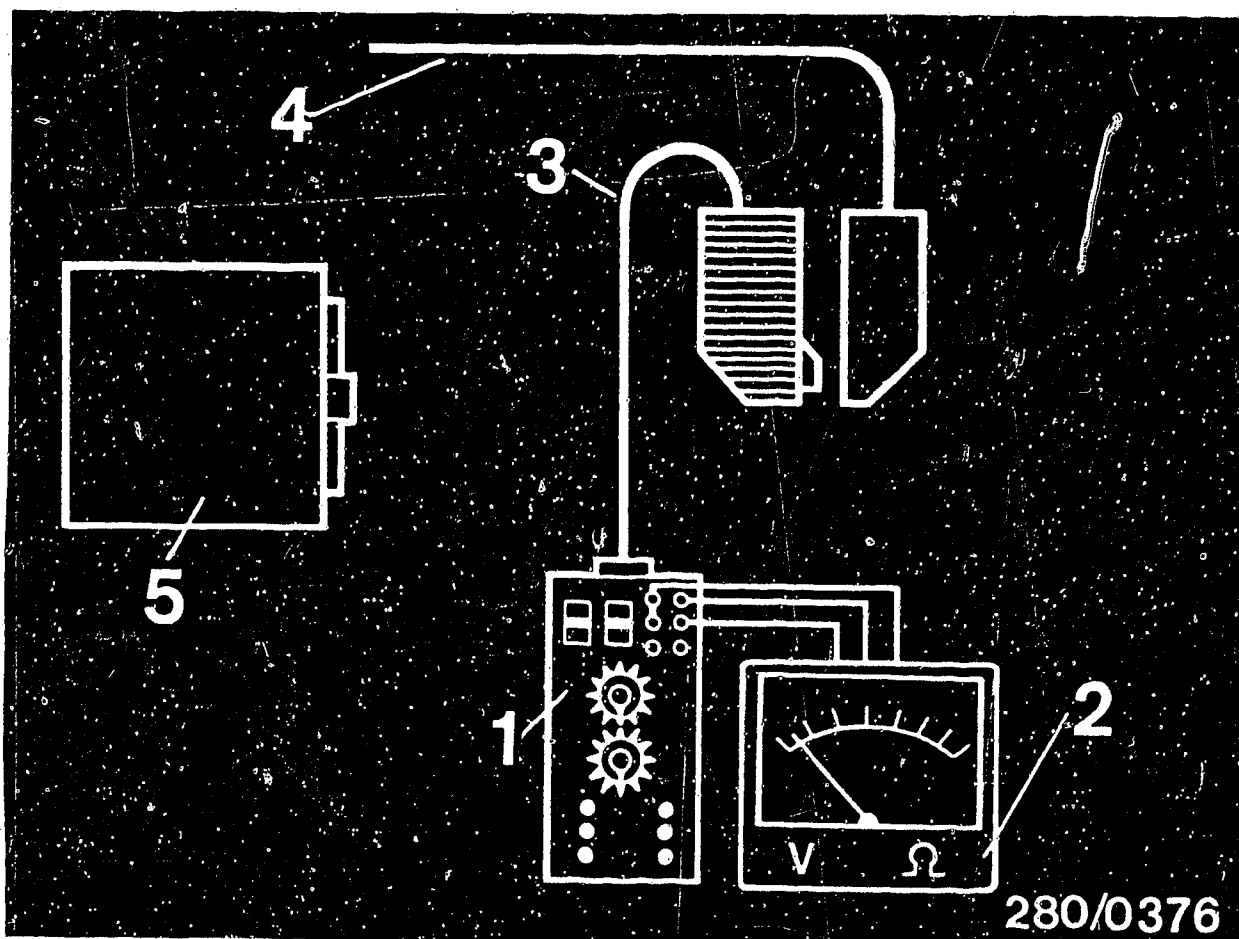




Universal adapter with adapter lead for L-Jetronic

- 1 = Adapter lead (Part No.: 1 684 463 129)
- 2 = Universal test adapter (Part No.: 0 684 101 801)
- 3 = Test wells (for motortester)
- 4 = Test sockets (for voltage measurement)
- 5 = Test sockets (for resistance measurement)
- 6 = Test sockets (not yet occupied)
- 7 = Program switch "V"
- 8 = Program switch "Ω"
- 9 = Button panel (not occupied for L-Jetronic)





- | | |
|-------------------------------|-----------------------------|
| 1 = Universal test adapter | 4 = Vehicle wiring harness |
| 2 = Multimeter | 5 = L-Jetronic control unit |
| 3 = Adapter lead (L-Jetronic) | |

General:

The universal test adapter is plugged onto the vehicle wiring harness with the adapter lead.

Caution:

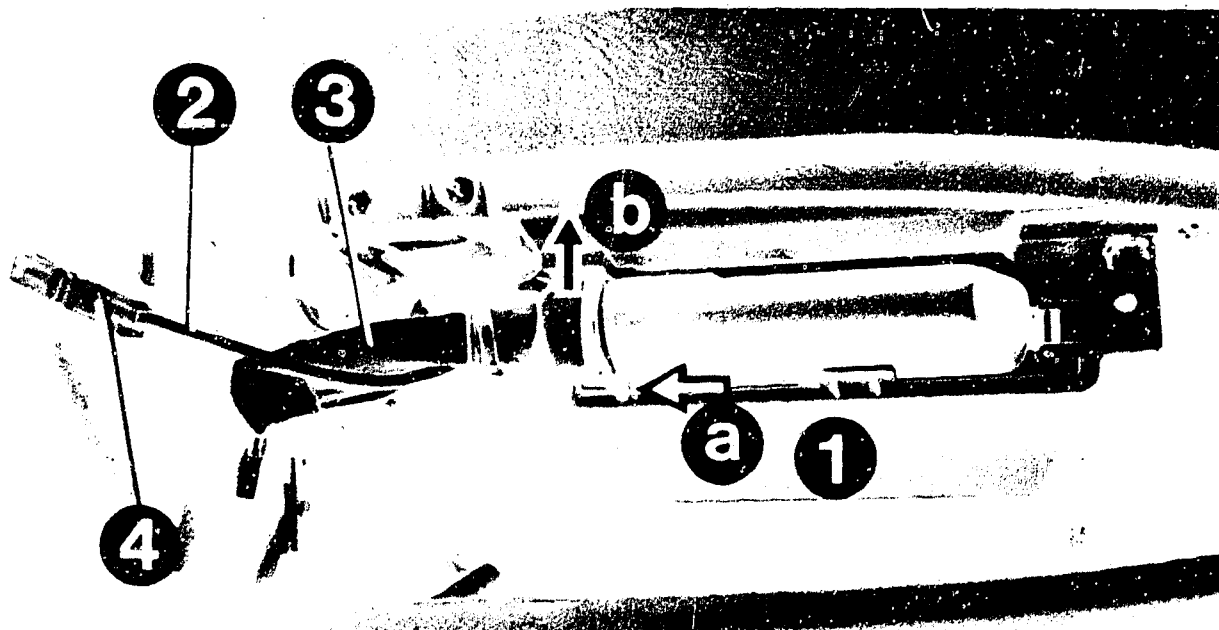
Connect and disconnect the universal test adapter only with the ignition off:

Testing:

For testing, connect a multimeter with R_i min. 20 k Ω /V to the test adapter.

It is also possible for the signal from term. 1 of the ignition coil to be measured with a motortester via the special input.





280/0047

- 1 = Control unit
- 2 = Lead from ignition coil term. 1 to control unit term. 1
- 3 = Jetronic wiring harness
- 4 = Plug connector

Installation position of components

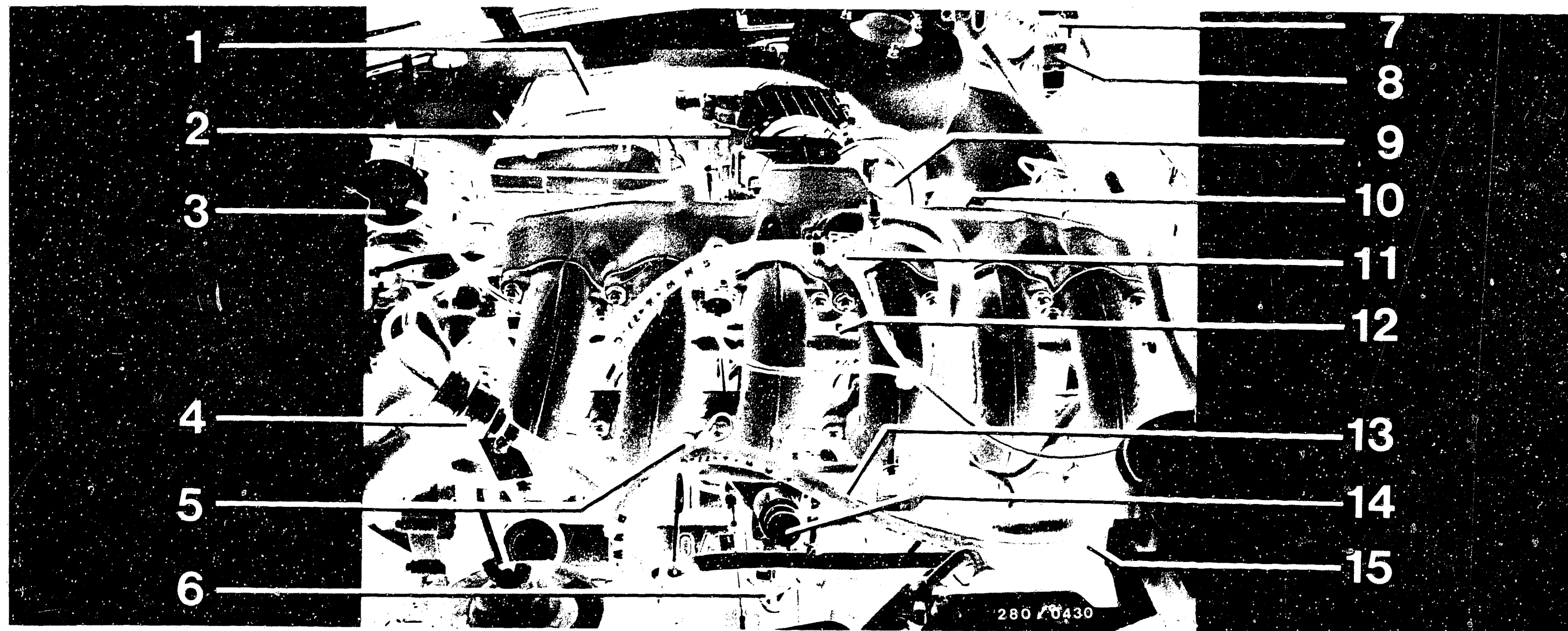
The indications "right" and "left" apply when viewed from behind the vehicle.

On 5 and 6 series: In the glove compartment (behind a cover)

On 7 series: In the front passenger footwell on the right-hand side behind a cover.

For connection of the universal test adapter, the plug-in locking device must be pressed in the arrow direction "a" and the plug swung out in the arrow direction "b".





Overall view of engine - 6 and 7 series up to 7.1979 (5 series similar)

- 1 = Air filter
- 2 = Air-flow sensor
- 3 = Ignition distributor
- 4 = Pressure regulator
- 5 = Central ground
- 6 = Thermo-time switch (brown plug)
- 7 = Post-start relay
- 8 = Relay set

- 9 = Throttle-valve switch
- 10 = Vacuum limiter (only on Sweden version)
- 11 = Start valve (blue plug)
- 12 = Injection valve (grey plug)
- 13 = Temperature sensor II (engine) (white plug)
- 14 = Auxiliary-air device (water-heated)
- 15 = Fuel delivery line

Electric fuel pump: Beneath vehicle, on right-hand side, near rear axle.

Fuel filter: Underneath vehicle, on right-hand side, near rear axle.

Fuel pump fuse: In central fuse box (fuel pump).

1st fuel-line-pressure damper: In delivery line, between intake manifold and firewall.

2nd fuel-line-pressure damper: In return line, after pressure regulator.

A20

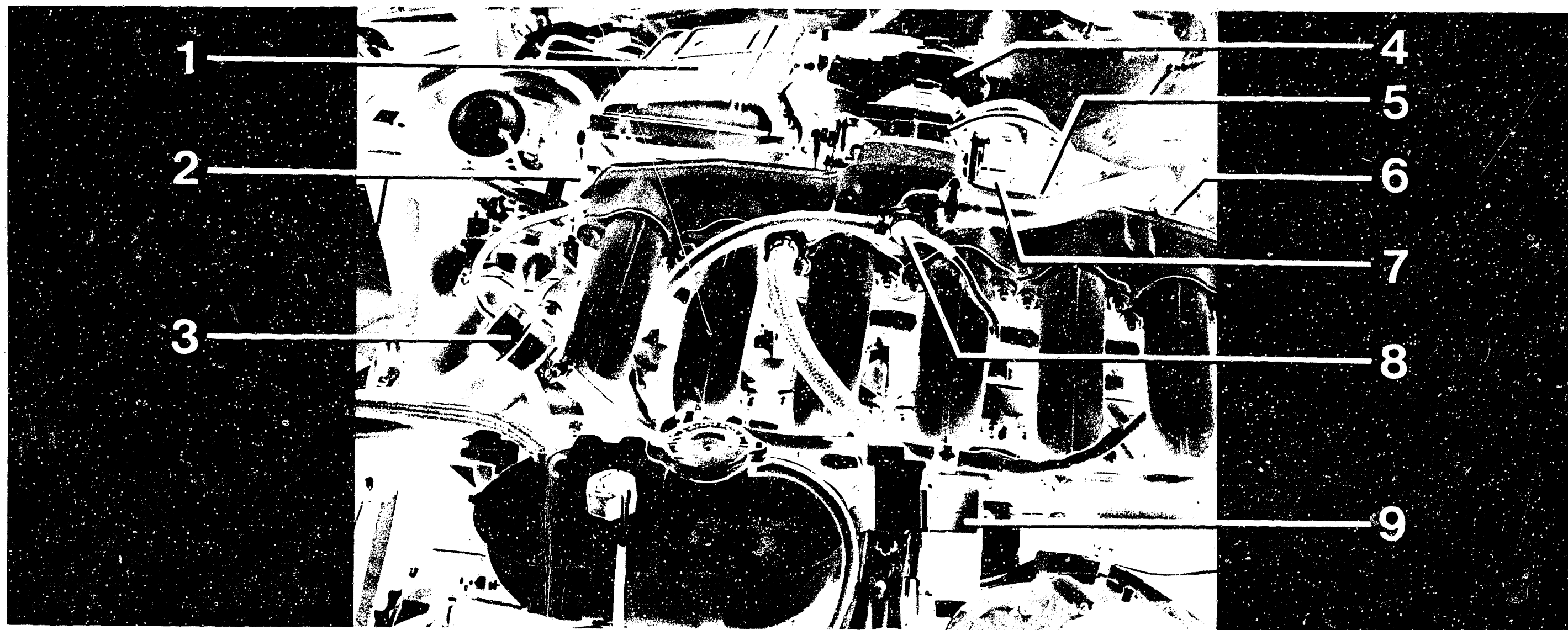
Installation position of components
BMW 5, 6 and 7 series



A21

Installation position of components
BMW 5, 6 and 7 series





Overall view of engine - 5 and 6 series as of 8.1979 (7 series similar)

- 1 = Air filter
- 2 = Thermo-time switch
- 3 = Pressure regulator
- 4 = Air-flow sensor
- 5 = Vacuum limiter
- 6 = Auxiliary-air device (black plug)
- 7 = Throttle-valve switch
- 8 = Start valve (blue plug)
- 9 = Relay set

Electric fuel pump:

Fuel filter:

Fuel pump fuse:

1st fuel-line-pressure damper:

2nd fuel-line-pressure damper:

Injection valves:

Central ground:

Underneath vehicle, on right-hand side, near rear axle

Underneath vehicle, on right-hand side, near rear axle

In central fuse box (fuel pump)

In delivery line between intake manifold and firewall

In return line after pressure regulator

Between intake manifold and engine block

Between 1st and 2nd injection valves

A22

Installation position of components
BMW 5, 6 and 7 series



A23

Installation position of components
BMW 5, 6 and 7 series



Important general information

1. Never start engine without securely connected battery.
2. Do not use a starting aid with more than 16 V or a fast charger for starting.
3. Never disconnect battery from vehicle electrical system with engine running.
4. Disconnect battery from vehicle electrical system when fast charging.
5. Remove control unit at temperatures above 80°C (paint drying installation).
6. Ensure that all connectors of wiring harness are properly attached.
7. Never connect or disconnect wiring-harness plug of control unit with ignition switched on.
8. When testing compression, cut the red power supply lead between battery and relay set by disconnecting the plug-in connection.
This ensures that the voltage supply for the L-Jetronic and therefore also for the injection valves is interrupted. Undesired injecting is thus prevented.
9. Remove the L-Jetronic control unit before carrying out electric welding work (e.g. spot welding).
10. When using the following trouble-shooting program it is assumed that the engine is in proper working order and that the ignition is correctly set. The electrical system must be checked and, if necessary, repaired.

In order to carry out the testing operations described in this manual and in order to assess the components, you should be familiar with the L-Jetronic and how it works. The essential points regarding the operation and construction of the L-Jetronic are described in Technical Instruction VDT-U 3/3 En.



Trouble-shooting charts

The following trouble-shooting charts are designed to enable workshop employees, using the universal test adapter with adapter lead (1 684 463 129) and other suitable test equipment, to quickly locate causes of trouble on the L-Jetronic. Depending on the level of knowledge and experience of the mechanic, a choice can be made between the following procedures:

- Detailed, step-by-step trouble-shooting chart for employees with little experience and who are not familiar with vehicles featuring the L-Jetronic. The entry level following a customer complaint is always that of a complete trouble-shooting program.
- Pinpointed trouble-shooting chart leading directly to the cause of the fault for trained and experienced employees who are more familiar with L-Jetronic vehicles. Following a customer complaint, the entry level can be at a certain component within the trouble-shooting program if so desired.

B3**B5**

Both trouble-shooting charts begin by checking the electrical/electronic part of the L-Jetronic with the aid of the universal test adapter with adapter lead. In this way, the wiring harness with the connected components is soon checked for proper electrical operation and faults are quickly located.

If no fault is found using the universal test adapter, it is necessary to test the fuel pressure.

If no fault is found, continue trouble-shooting with the detailed or the direct trouble-shooting program.

B1

Trouble-shooting
BMW 5, 6 and 7 series

**B2**

Trouble-shooting
BMW 5, 6 and 7 series



1. Detailed step-by-step trouble-shooting

1.1 Test with universal test adapter with adapter lead 1 684 463 129

This test must come at the beginning of the test program and must be performed from beginning to end (Coordinates B9...E1).

1.2 Fuel pressure test

This test must come immediately after the test with the universal test adapter and must be performed from beginning to end (Coordinates E2...E11).

1.3 Trouble-shooting according to customer complaints (symptoms of trouble)

The table below contains possible symptoms of trouble and gives the first coordinate of the relevant detailed trouble-shooting program in the column on the right.

The trouble-shooting program consists of logically ordered test procedures for all individual components of the L-Jetronic. If, after completing the trouble-shooting program for an assumed trouble, the fault has not been detected or remedied, take a new symptom of the trouble and work through another program.

<u>Customer complaints (symptoms of trouble)</u>	<u>Universal test adapter</u>	<u>Fuel pressure test</u>	<u>Coordinate</u>
1. Engine fails to start or starts only with great difficulty	B 9	E 2	E 12
2. Engine starts but then dies	B 9	E 2	F 7
3. Uneven engine idle	B 9	E 2	G 1
4. Poor throttle take-up	B 9	E 2	H 1
5. Engine missing under all operating conditions	B 9	E 2	H 15
6. Fuel consumption too high	B 9	E 2	J 15
7. No maximum engine power, top speed not reached	B 9	E 2	K 1
8. CO concentration at idle too high or too low	B 9	E 2	K 13

B3

Trouble-shooting
BMW 5, 6 and 7 series



B4

Trouble-shooting
BMW 5, 6 and 7 series



2. Pin-pointed direct trouble-shooting

2.1 Test with universal test adapter with adapter lead 1 684 463 129

The test with the universal test adapter must come at the beginning of the test program and must be performed from beginning to end (Coordinates B9...E1).

2.2 Fuel pressure test

The fuel pressure test must come immediately after the test with the universal test adapter and must be performed from beginning to end (Coordinates E2...E11).

2.3 Trouble-shooting according to customer complaints

The table below contains various symptoms of trouble with several possible causes of the trouble in each case. The coordinate reference field indicates the first coordinate of the test procedure for the respective L-Jetronic component. If, after testing the individual components, the fault has not been detected or remedied, choose a new symptom of the trouble.

Customer complaint (symptom of trouble)

1. Engine fails to start or starts only with great difficulty								
2. Engine starts but then dies								
3. Uneven engine idle, idle speed incorrect								
4. Poor throttle take-up								
5. Engine missing under all operating conditions								
6. Fuel consumption too high								
7. No maximum engine power								
8. CO concentration at idle too high or too low								
Cause (component fault)								
B9	B9	B9	B9	B9	B9	B9	B9	Universal test adapter
E2	E2	E2	E2	E2	E2	E2	E2	Fuel pressure test: Pressure regulator defective, relay set defective, fuel pump not operating, pump contact not closing
E22	F11		H5					Auxiliary-air device not opening
		G11						Auxiliary-air device not closing
F3	F15	G15	H7	H21	J21	K9	K17	Air-flow sensor defective, potentiometer test (noise test)
	F15			J1				Pump contact in air-flow sensor defective (engine stopped)
		G17		J9				Vacuum limiter defective (on Sweden version only)

Continued on B7/B8

B5

Trouble-shooting
BMW 5, 6 and 7 series



B6

Trouble-shooting
BMW 5, 6 and 7 series



Customer complaints (symptoms of trouble)

1. Engine fails to start or starts only with great difficulty
2. Engine starts but then dies
3. Uneven engine idle, idle speed incorrect
4. Poor throttle take-up
5. Engine missing under all operating conditions
6. Fuel consumption too high
7. No maximum engine power
8. CO concentration at idle too high or too low

Cause (component fault)

E20		G7						Thermo-time switch defective
F5	F17	G17	H11			K11	K21	Air-intake system leaking
		G13		H19	J21	K3		Solenoid-operated injection valves defective; connect test lead
E14								Start valve not opening; post-start relay defective (if fitted)
E14	F9	G9			J17		K19	Start valve leaking
				J5		K7		Fuel delivery too low
F1	F13				J19		K21	Temperature sensor II in engine defective
		G3	H3	J7				Throttle valve not closing (test overrun cutoff)
						K3		Throttle valve not opening fully
				J5		K11		Poor central ground, loose contacts, faulty plug-in connections
F3		G17		H17				Open circuit in wiring harness and plug-in connections; interference; missing
		G3	H3			K3		Throttle-valve switch defective
		G5	H13		J23		K19	CO exhaust-gas setting too rich, idle adjustment
		G5	H13	J11			K19	CO exhaust-gas setting too lean, idle adjustment
				J5				Control unit defective

B7

Trouble-shooting
BMW 5, 6 and 7 series



B8

Trouble-shooting
BMW 5, 6 and 7 series



Test chart for universal test adapter with connected
L-Jetronic system adapter lead (1 684 463 129)
Test chart for BMW 5, 6 and 7 series - year of
manufacture 77 to 81

Carefully plug the universal test adapter onto the vehicle wiring harness. (Ignition must be off). Only the peripherals are tested.

For taking measurements, a multimeter (for voltage and resistance measurements) as well as a motortester must be connected to the universal test adapter.

The individual test steps are selected by means of two program switches (one for voltage measurements, the other for resistance measurements). Each program switch has 24 test positions, but not all of these are occupied for the L-Jetronic. Be sure to follow the instructions in the test chart.

Test steps 1...12 measure voltages during starting.
Caution: Set the multimeter to the voltage range.

Test steps 13...22 measure resistances.

Caution:

Set the multimeter to the resistance measuring range.

While trouble-shooting, ignition "OFF" and remove multiple plug of adapter lead.

The test specifications and operating instructions for the universal test adapter are given in the following test chart.

Installation position of control unit:

On 7 series: In passenger compartment, on front passenger side, in footwell behind a cover. It is fastened in position by three screws.

On 5 and 6 series: In glove compartment behind a cover.



Requirements for correct test procedure:

1. Start testing with test step 1.
2. The sequence of the test steps must be kept to. In each case, the trouble-shooting set out below each test step is based on the trouble-shooting set out below the previous test steps.
Example: If the ground connections term. 5 and term. 6 for the air-flow sensor are tested in test step 14, this test is not repeated in the further test steps.
3. If an incorrect reading is obtained for a test step, this test step must be repeated after the fault has been remedied.

Note:

As regards the following test steps, the texts in boxes indicate the operation to be changed with respect to the preceding test step.



<u>Test step 1</u>		<u>Reading</u>	<u>Testing</u>
<u>Operation</u>			
<u>Program switch position "V":</u>	3	Multimeter must indicate <u>8 ... 15 V.</u> If reading O.K., continue testing with <u>test step 2.</u>	<u>Component:</u> Relay set Starting motor term. 50
<u>Program switch position:</u>	1)		
<u>Measuring equipment:</u> Multimeter (Volt range)			<u>Operation:</u> Starting signal
<u>Measuring range:</u> 0...15 V			
<u>Connection:</u> Test sockets red (positive) and black			<u>Malfunction:</u> No voltage reading
<u>Operation in vehicle:</u> Ignition "ON" and operate starting motor			

Trouble-shooting:

For all voltage measurements:

1. Set value 8...15 V (when operating starting motor).
2. Make measurement at the respective component plug.
3. The connector remains plugged onto the relay set.

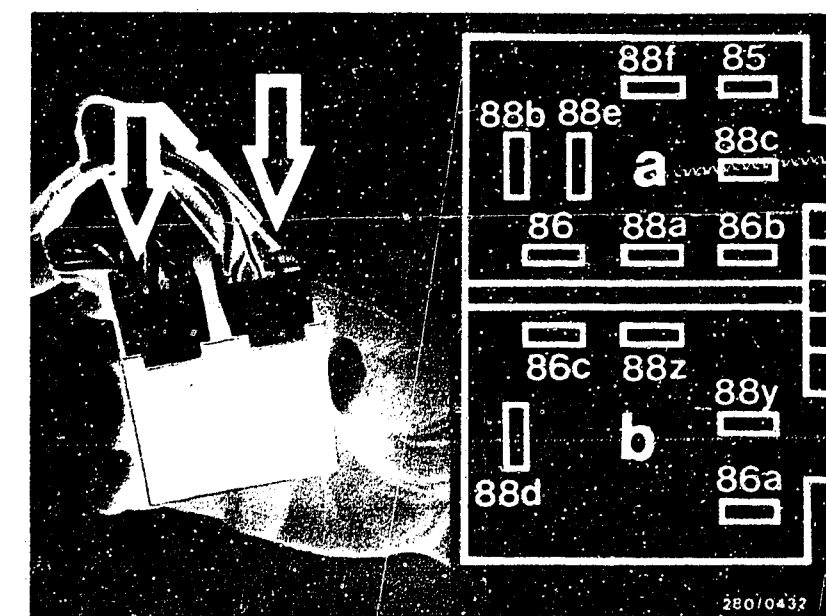
For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω .

Important! Ignition "OFF" and ensure proper electrical connection when measuring.

- 1) Switch position not specified

Continued on B13/B14



Measure voltage on back of plug.

Relay set

0 332 514 121

a = Jetronic wiring harness

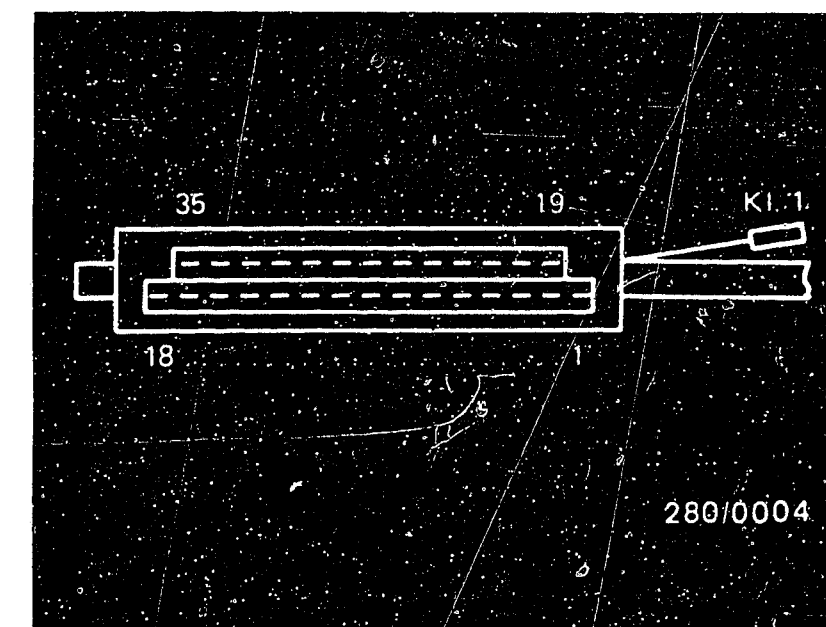
b = Vehicle wiring harness

(No term. 88f on relay set

0 332 514 105)

Top view of multiple plug

K1.1 = Term. 1



B11

Test chart for universal test adapter
BMW 5, 6 and 7 series



B12

Test chart for universal test adapter
BMW 5, 6 and 7 series



Voltage reading below 8 V:

Battery insufficiently charged or high voltage drops.

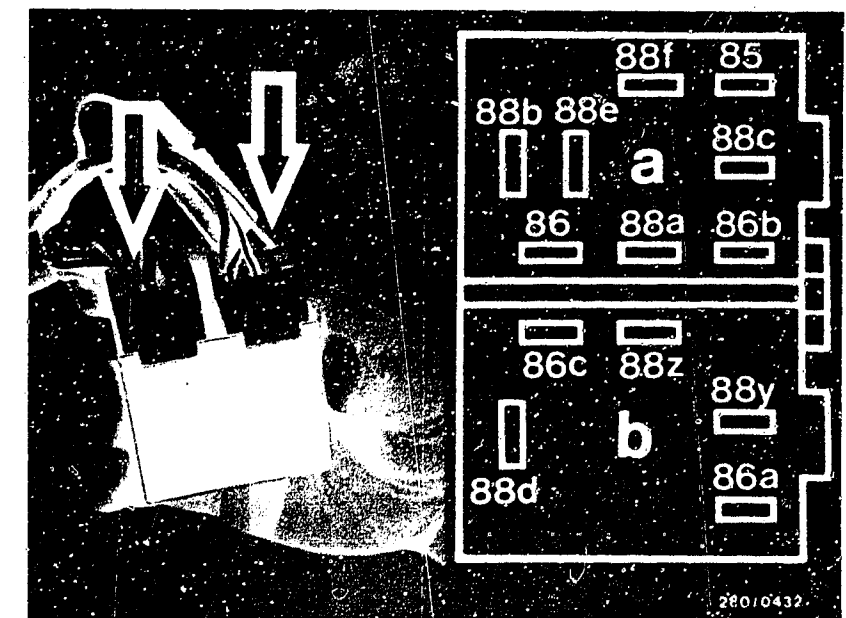
No voltage reading:

1. Voltage at relay set term. 86a? If no voltage, test lead to starting motor term. 50. Test ground connection from multiple plug term. 5 to central ground.
2. Voltage at relay set term. 86? If no voltage, replace relay set.
3. Test lead from relay set term. 86 to multiple plug term. 4.

Eliminate contact resistances at the plug-in connections.

Installation position of components:

- Relay set:
- On 5 and 6 series: Near fuse box.
 - On 7 series: On firewall on right-hand side.
- Central ground:
- Between 1st and 2nd injection valves.
- Control unit:
- On 5 and 6 series: In glove compartment behind a cover.
 - On 7 series: Front passenger side, in footwell on right-hand side, behind a cover.



Measure voltage on back of plug.

Relay set

0 332 514 121

a = Jetronic wiring harness

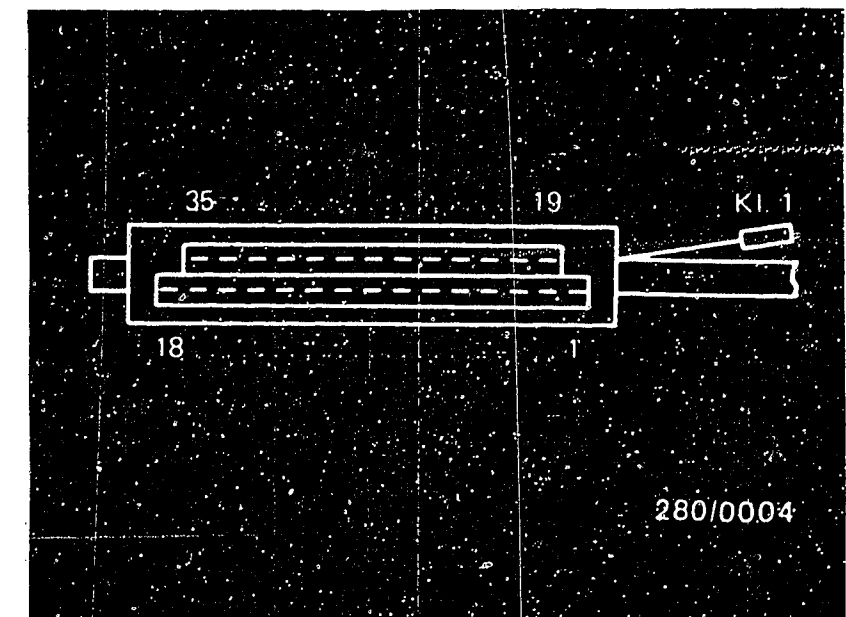
b = Vehicle wiring harness

(No term. 88f on relay set

0 332 514 105)

Top view of multiple plug

Kl. 1 = Term. 1



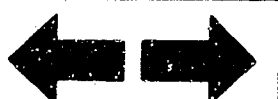
B13

Test chart for universal test adapter
BMW 5, 6 and 7 series



B14

Test chart for universal test adapter
BMW 5, 6 and 7 series



Test step 2 (need not be performed with water-heated auxiliary-air device).			
<u>Operation</u>		<u>Reading</u>	<u>Testing</u>
<u>Program switch position "V":</u>	4	Multimeter must indicate <u>8 ... 15 V.</u> If reading O.K., continue testing with <u>test step 3.</u>	<u>Component:</u> Auxiliary-air device, relay set
<u>Program switch position:</u>	-		
<u>Measuring equipment:</u> Multimeter (Volt range)			<u>Operation:</u> Power supply
<u>Measuring range:</u> 0 ... 15 V			
<u>Connection:</u> Test sockets red (positive) and black			
<u>Operation in vehicle:</u> Ignition "ON" and operate starting motor			<u>Malfunction:</u> No reading

Trouble-shooting:

For all voltage measurements:

1. Set value 8...15 V (when operating starting motor).
2. Make measurement at the respective component plug.
3. The connector remains plugged onto the relay set.

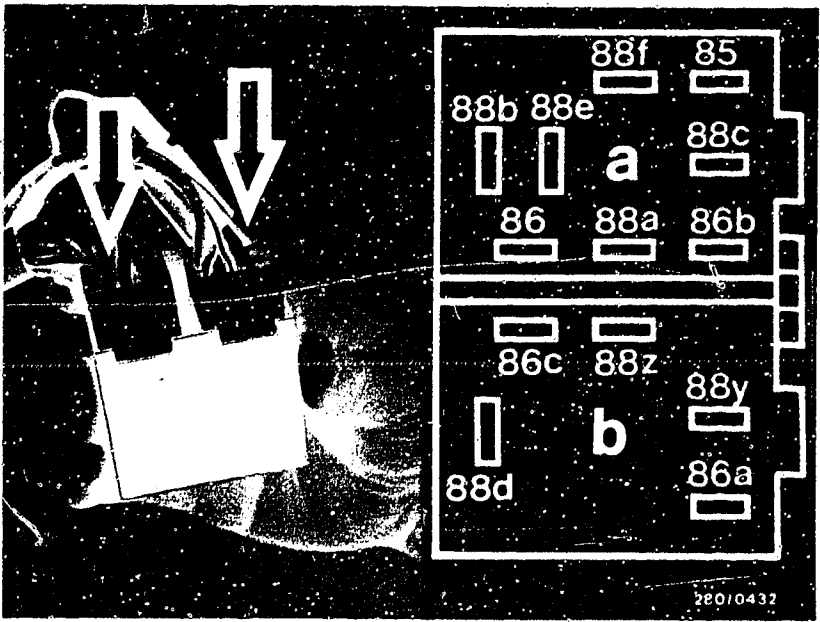
For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω.

Important! Ignition "OFF" and ensure proper electrical connection when measuring.

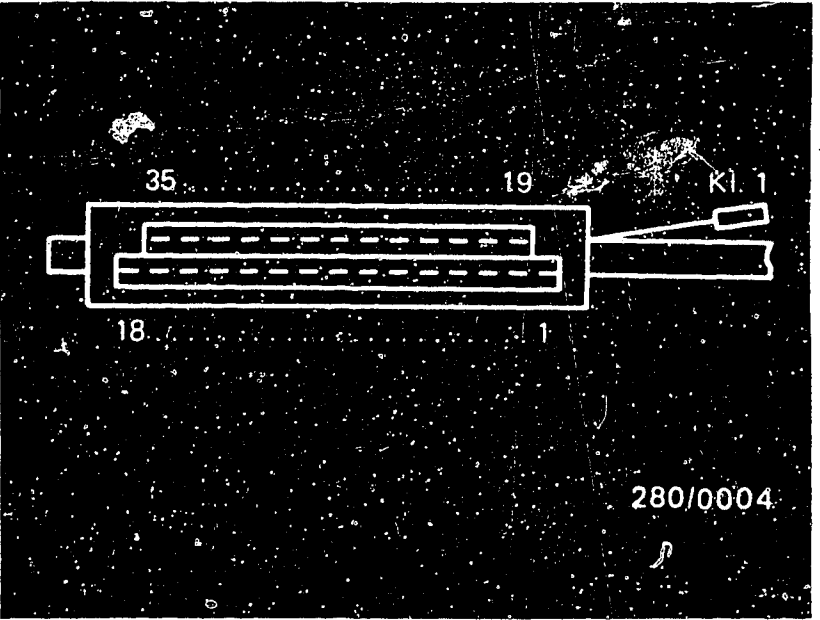
a) Start engine; electric fuel pump operates.

1. Voltage at relay set term. 88c? If no voltage, test lead 28 from relay set term. 85 to multiple plug term. 28 and multiple plug term. 16 to central ground. If fault not eliminated, replace relay set.



Measure voltage on back of plug.
 Relay set
 0 332 514 121
 a = Jetronic wiring harness
 b = Vehicle wiring harness
 (No term. 88f on relay set 0 332 514 105)

Top view of multiple plug
Kl. 1 = Term. 1



Trouble-shooting (continued)

2. Voltage at auxiliary-air device term. 48? If no voltage, test lead 48 from auxiliary-air device to relay set term. 88c.
3. Test auxiliary-air device for continuity. Set value 25 ... 60 Ω . If not, replace auxiliary-air device.
4. Test lead 34 from auxiliary-air device to multiple plug term. 34.

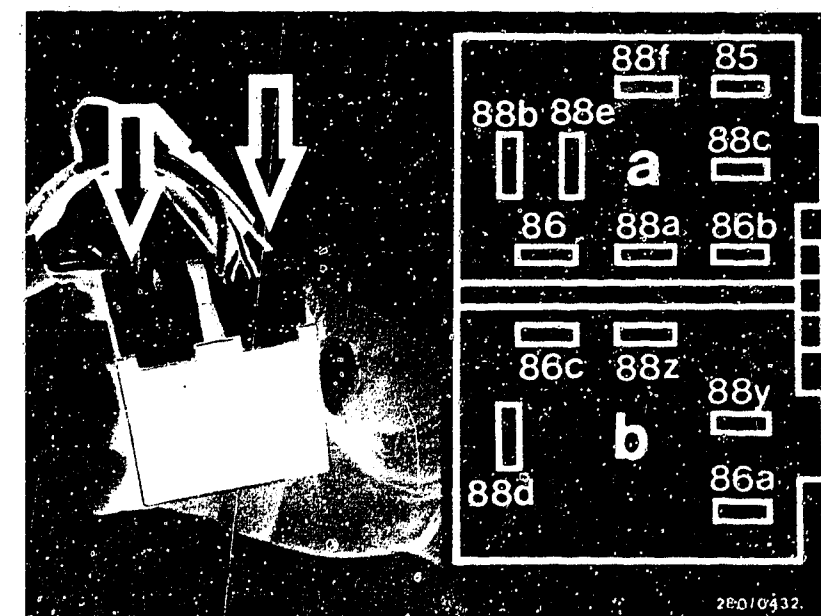
b) Crank engine; electric fuel pump does not operate

1. Voltage at relay set term. 88y? If no voltage, test pump fuse and power supply term. 30.
2. Voltage at relay set term. 88d? If no voltage, replace relay set.
3. Test electric fuel pump and leads (ground connection).
4. Voltage at relay set term. 88c? If no voltage, test lead 28 from relay set term. 85 to multiple plug term. 28 and multiple plug term. 16 to central ground. If fault not eliminated, replace relay set.
5. Voltage at auxiliary-air device term. 48? If no voltage, test lead 48 from auxiliary-air device to relay set term. 88c.
6. Test auxiliary-air device for continuity. Set value 25 ... 60 Ω . If not, replace auxiliary-air device.
7. Test lead 34 from auxiliary-air device to multiple plug term. 34.

Eliminate contact resistances at the plug-in connections.

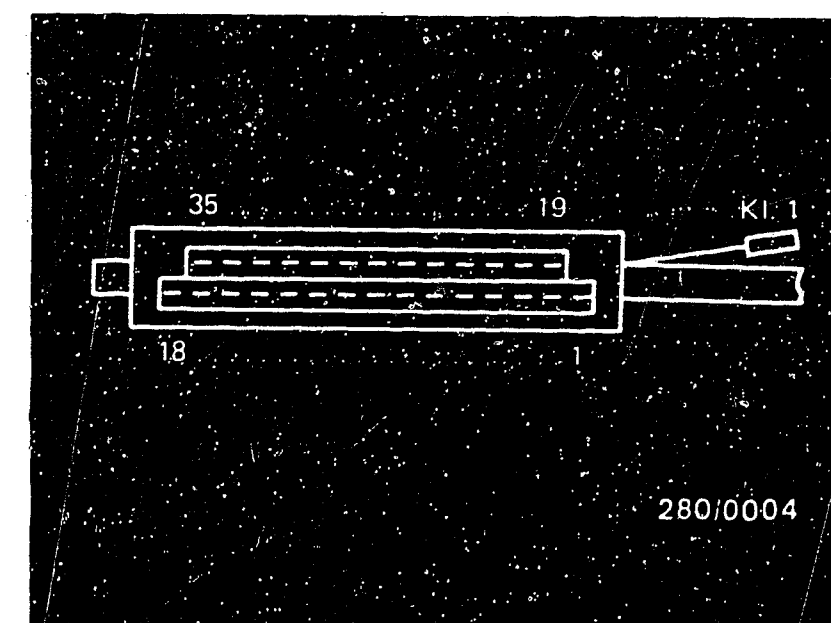
Installation position of components:

- | | |
|------------------------------------|--|
| Relay set: | On 5 and 6 series: Near fuse box.
On 7 series: On firewall on right-hand side. |
| Control unit: | On 5 and 6 series: In glove compartment, behind a cover.
On 7 series: Front passenger side, in footwell on right-hand side, behind a cover. |
| Auxiliary-air device: | On engine block underneath intake manifold. As of 8.79 on the valve cover. |
| Fuel pump fuse: | In central fuse box (fuel pump) |
| Electric fuel pump: | Underneath vehicle on right-hand side, near rear axle. |
| Ground lead of electric fuel pump: | Underneath rear seat bench, on left-hand side (recess) ground point on body. |



Measure voltage on back of plug.
Relay set
0 332 514 121
a = Jetronic wiring harness
b = Vehicle wiring harness
(No term. 88f on relay set
0 332 514 105)

Top view of multiple plug
K1. 1 = Term. 1



B 17

Test chart for universal test adapter
BMW 5, 6 and 7 series

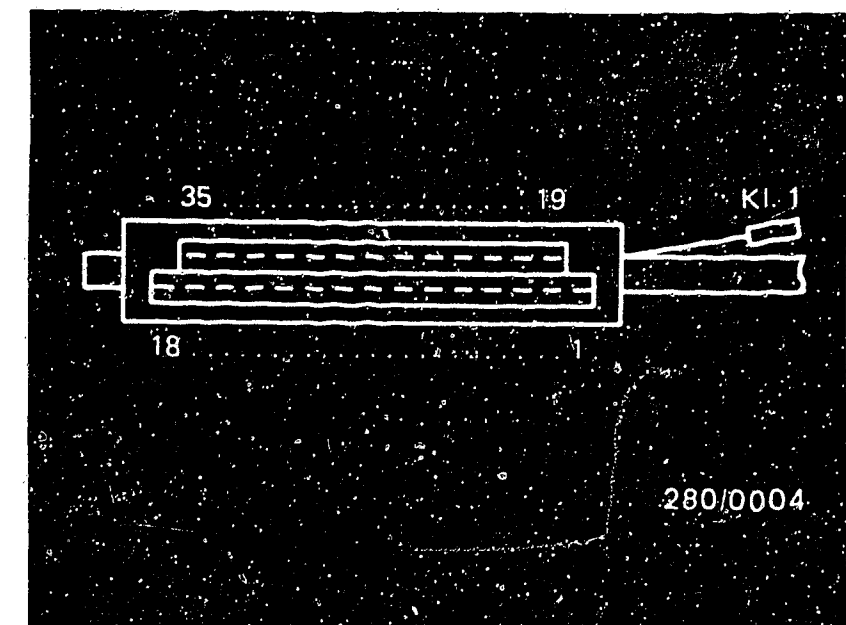


B 18

Test chart for universal test adapter
BMW 5, 6 and 7 series



<u>Test step 3</u>		<u>Reading</u>	<u>Testing</u>
<u>Operation</u>			
<u>Program switch position "V":</u>	5	<u>Ignition oscilloscope must indicate ignition pulses.</u>	<u>Component:</u> Signal from term. 1
<u>Program switch position:</u>	-		
<u>Measuring equipment:</u> Motortester			<u>Operation:</u> Triggering of control unit by the ignition
<u>Measuring range:</u> Special input, control lever all the way to the left Measuring range 20 V			
<u>Connection:</u> Test wells			<u>Malfunction:</u> No reading
<u>Operation in vehicle:</u> Ignition "ON" and operate starting motor			



Top view of multiple plug
KI. 1 = Term. 1

Trouble-shooting:

For all voltage measurements:

1. Set value 8...15 V (when operating starting motor).
2. Make measurement at the respective component plug.
3. The connector remains plugged onto the relay set.

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω .

Important! Ignition "OFF" and ensure proper electrical connection when measuring.

Lead from multiple plug term. 1 to ignition coil term. 1 dropped off?

Test and, if necessary, repair.

Voltage at ignition coil term. 1? If not, check ignition system. If voltage present, test lead 1 for continuity or for short circuit to ground.

If the lead is O.K., then the trigger stage in the control unit has failed. Replace control unit.

Installation position of components:

Control unit:

5, 6 series: In glove compartment behind a cover.

7 series: Front passenger side, in footwell on right-hand side, behind a cover.

Central ground:

In engine compartment, center, between 1st and 2nd injection valves.

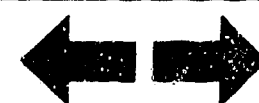
B19

Test chart for universal test adapter
BMW 5, 6 and 7 series



B20

Test chart for universal test adapter
BMW 5, 6 and 7 series



<u>Test step 4</u>			
<u>Operation</u>		<u>Reading</u>	<u>Testing</u>
<u>Program switch position "V":</u>	6	Multimeter <u>must</u> indicate <u>8 ... 15 V .</u>	<u>Component:</u> Relay set, power supply
<u>Program switch position:</u>	-		
<u>Measuring equipment:</u> Multimeter (Volt range)			<u>Operation:</u> Power supply
<u>Measuring range:</u> 0...15 V			
<u>Connection:</u> Test sockets red (positive) and black			<u>Malfunction:</u> No voltage reading
<u>Operation in vehicle:</u> Ignition "ON"			

Trouble-shooting:

For all voltage measurements:

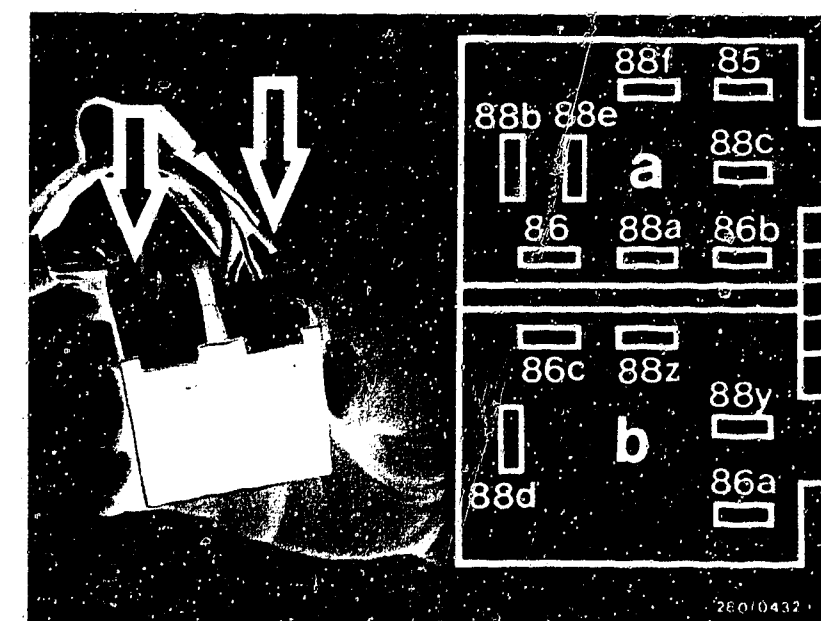
1. Set value 8...15 V (ignition "ON").
2. Make measurement at the respective component plug.
3. The connector remains plugged onto the relay set.

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω.

Important! Ignition "OFF" and ensure proper electrical connection when measuring.

1. Voltage at relay set term. 86c? If not, check lead term. 15.
2. Voltage at relay set term. 88z? If not, test lead to battery (positive terminal).
3. Voltage at relay set term 88a? If not, replace relay set.
4. Test lead 10 from relay set term. 88a to multiple plug term. 10 for continuity. Eliminate contact resistances at the plug-in connections.



Measure voltage on back of plug.

Relay set

0 332 514 121

a = Jetronic wiring harness

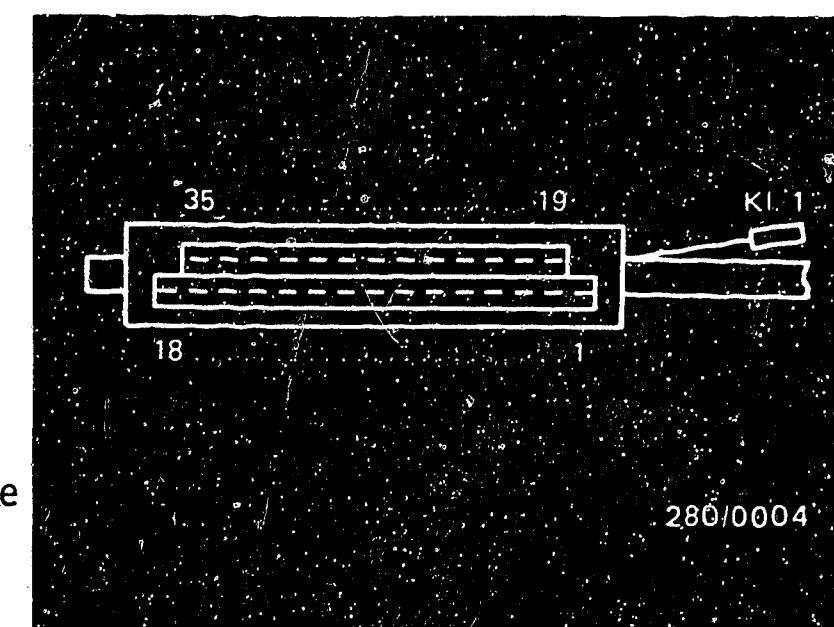
b = Vehicle wiring harness

(No term. 88f on relay set

0 332 514 105)

Top view of multiple plug

Kl. 1 = Term. 1



B21

Test chart for universal adapter

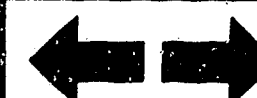
BMW 5, 6 and 7 series



B22

Test chart for universal adapter

BMW 5, 6 and 7 series



<u>Test step 5</u>			
<u>Operation</u>		<u>Reading</u>	<u>Testing</u>
<u>Program switch position "V":</u>	7	Multimeter must indicate 8 ... 15 V. If reading O.K., continue testing with <u>test step 6.</u>	<u>Component:</u> Control unit Relay set
<u>Program switch position:</u>	-		
<u>Measuring equipment:</u> Multimeter (Volt range)			
<u>Measuring range:</u> 0...15 V			
<u>Connection:</u> Test sockets red (positive) and black			
<u>Operation in vehicle:</u> Ignition "ON"			<u>Malfunction:</u> No voltage reading

Trouble-shooting:

For all voltage measurements:

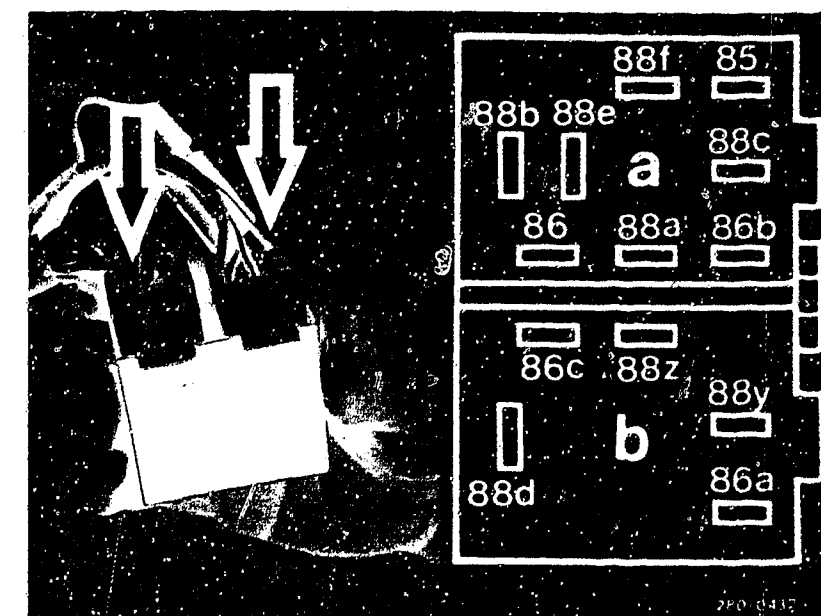
1. Set value 8...15 V.
2. Make measurement at the respective component plug.
3. The connector remains plugged onto the relay set.

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω .

Important! Ignition "OFF" and ensure proper electrical connection when measuring.

Continued on C1/C2



Measure voltage on back of plug.

Relay set

0 332 514 121

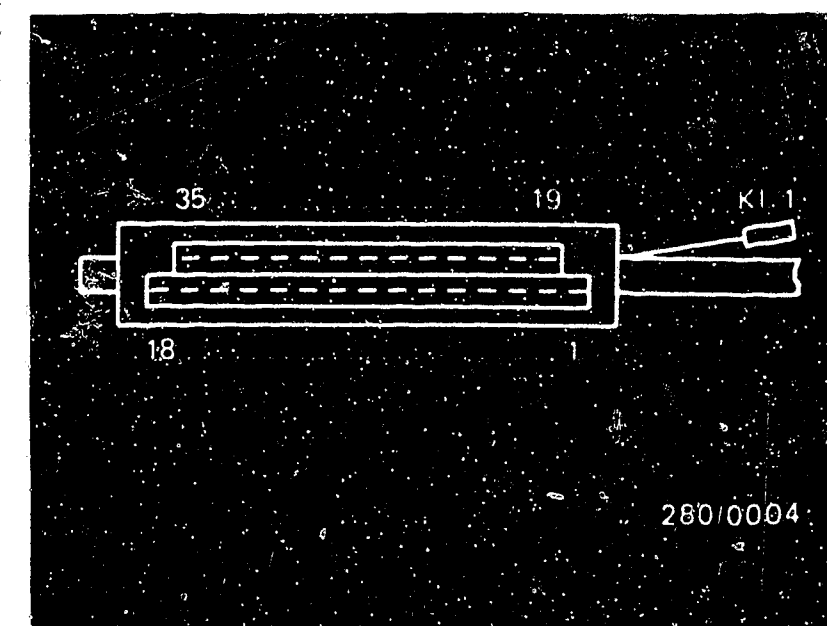
a = Jetronic wiring harness

b = Vehicle wiring harness

(No term. 88f on relay set

0 332 514 105)

Top view of multiple plug



280/0004

B23

Test chart for universal test adapter
BMW 5, 6 and 7 series



B24

Test chart for universal test adapter
BMW 5, 6 and 7 series



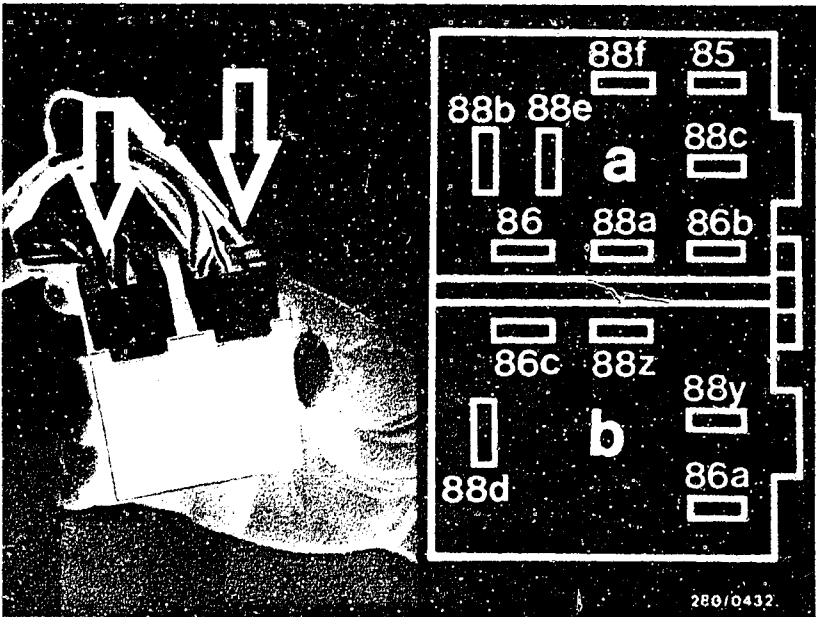
Trouble-shooting (continued)

1. Voltage at relay set term. 88e? If not, replace relay set.
2. Test plug-in connection at 1st solenoid-operated injection valve. If defective, repair plug-in connection.
3. Voltage at injection valve connector term. 37? If not, test lead from injection valve connector to relay set term. 88e.
4. Test lead 15 from injection valve connector to multiple plug term. 15 for continuity.

Eliminate contact resistances at the plug-in connections.

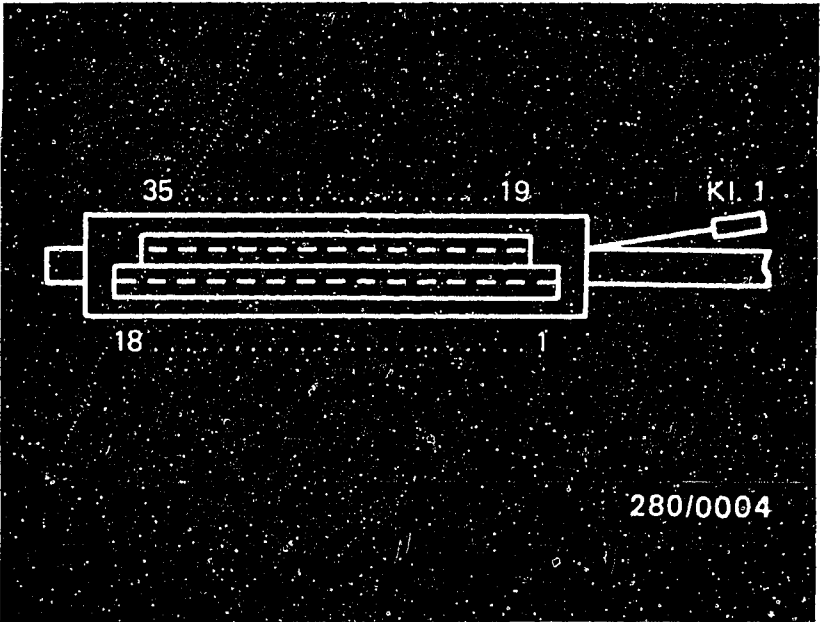
Installation position of components:

- Relay set: On 5 and 6 series: Near fuse box.
 On 7 series: On firewall, on right-hand side.
- Control unit: On 5 and 6 series: In glove compartment, behind a cover.
 On 7 series: Front passenger side, in footwell on right-hand side, behind a cover.
- Injection valve: Between intake manifold and engine block.



Measure voltage on back of plug.
Relay set
0 332 514 121
a = Jetronic wiring harness
b = Vehicle wiring harness
(No term. 88f on relay set
0 332 514 105)

Top view of multiple plug



Test step 6			
Operation		Reading	Testing
Program switch position "V":	8	Multimeter must indicate 8 ... 15 V. If reading O.K., continue testing with test step 7.	Component: Control unit, Relay set
Program switch position:	-		
Measuring equipment: Multimeter (Volt range)			Operation: Power supply to 2nd solenoid-operated injection valve
Measuring range:			
0...15 V			
Connection			Malfunction: No voltage reading
Test sockets red (positive) and black			
Operation in vehicle:			
Ignition "ON"			

Trouble-shooting:

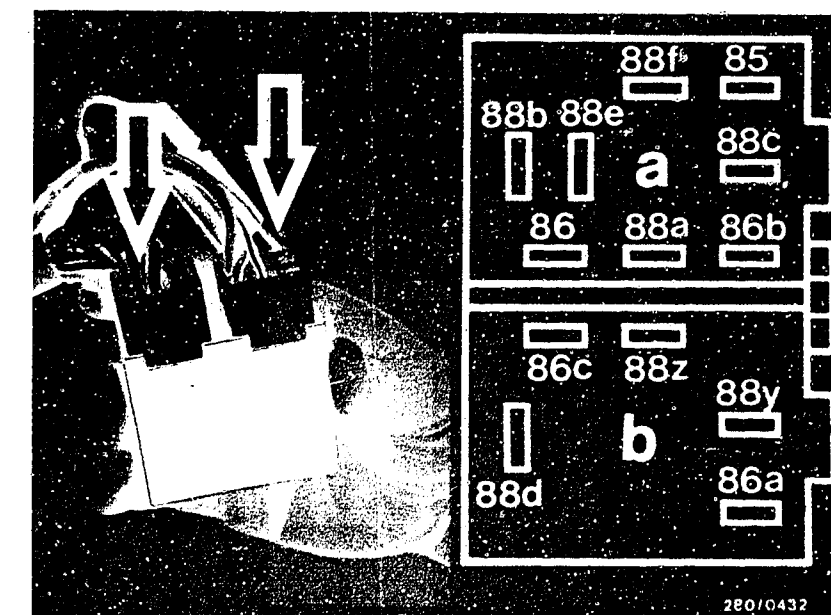
For all voltage measurements:

1. Set value 8 ... 15 V (ignition "ON").
2. Make measurement at the respective component plug.
3. The connector remains plugged onto the relay set.

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω .

Important! Ignition "OFF" and ensure proper electrical connection when measuring.



Measure voltage on back of plug.

Relay set

0 332 514 121

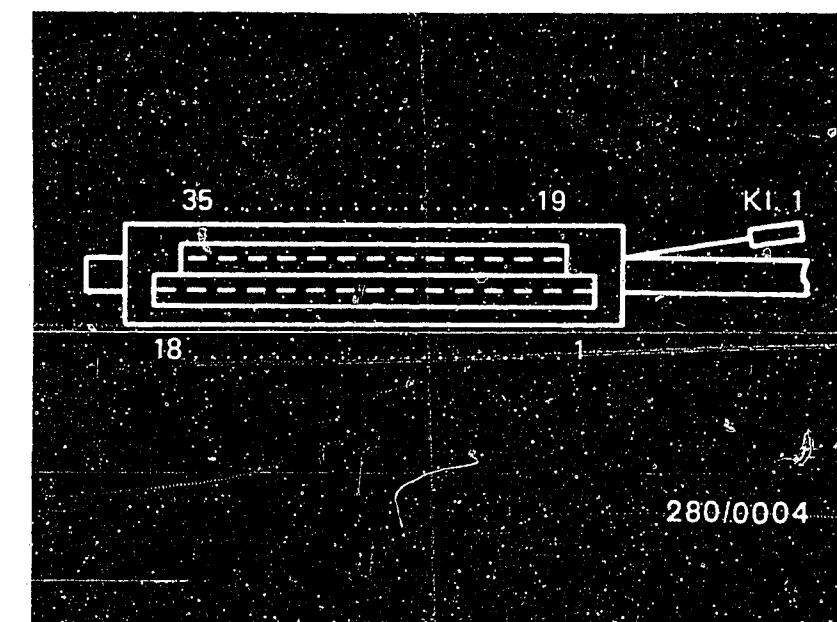
a = Jetronic wiring harness

b = Vehicle wiring harness

(No term. 88f on relay set

0 332 514 105)

Top view of multiple plug



Continued on C5/C6

C3

Test chart for universal test adapter
BMW 5,6 and 7 series



C4

Test chart for universal test adapter
BMW 5, 6 and 7 series



Trouble-shooting (continued)

1. Voltage at relay set term. 88e? If not, replace relay set.
2. Test plug-in connection on 2nd solenoid-operated injection valve. If defective, repair plug-in connection.
3. Voltage at injection valve connector term. 38? If not, test lead from injection valve connector to relay set term. 88e.
4. Test lead 33 from injection valve connector to multiple plug term. 33 for continuity.

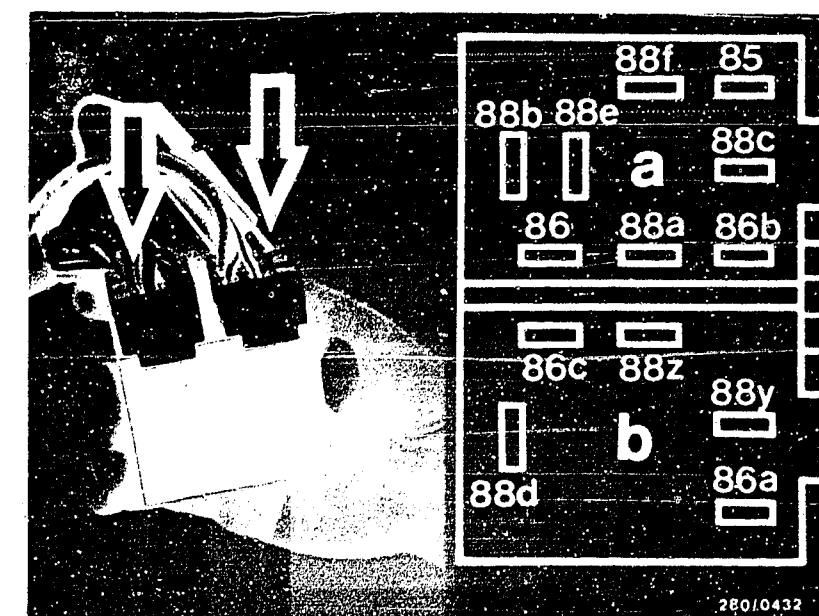
Eliminate contact resistances at the plug-in connections.

Installation position of components:

Relay set: On 5 and 6 series: Near fuse box.
 On 7 series: On firewall, on right-hand side.

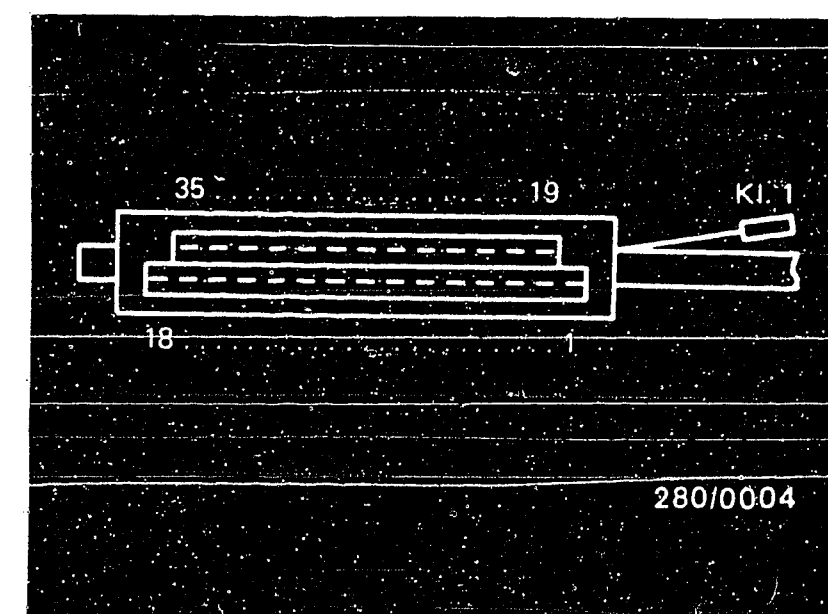
Control unit: On 5 and 6 series: In glove compartment, behind a cover.
 On 7 series: Front passenger side, in footwell on right-hand side, behind a cover.

Injection valve: Between intake manifold and engine block.



Measure voltage on back of plug.
 Relay set
 0 332 514 121
 a = Jetronic wiring harness
 b = Vehicle wiring harness
 (No term. 88f on relay set
 0 332 514 105)

Top view of multiple plug



C5

Test chart for universal test adapter
 BMW 5, 6 and 7 series

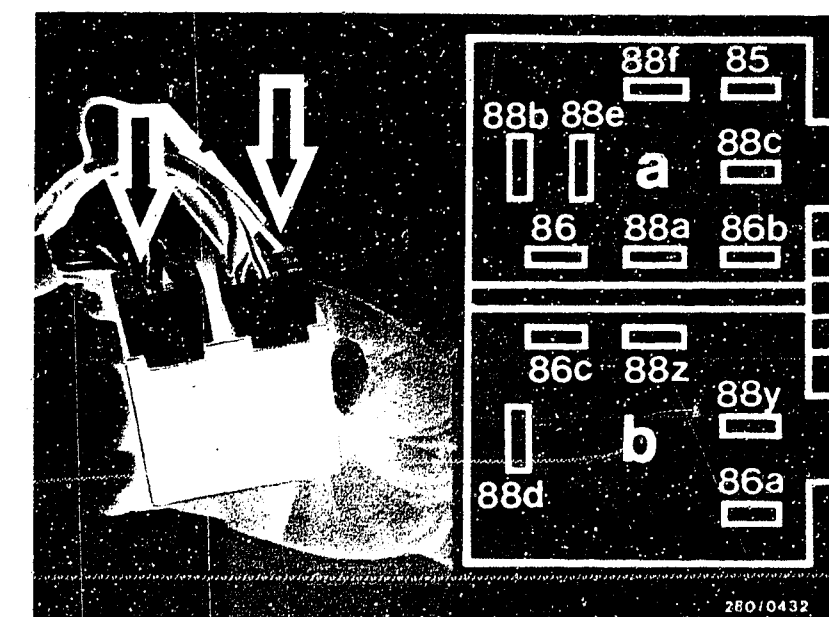


C6

Test chart for universal test adapter
 BMW 5, 6 and 7 series

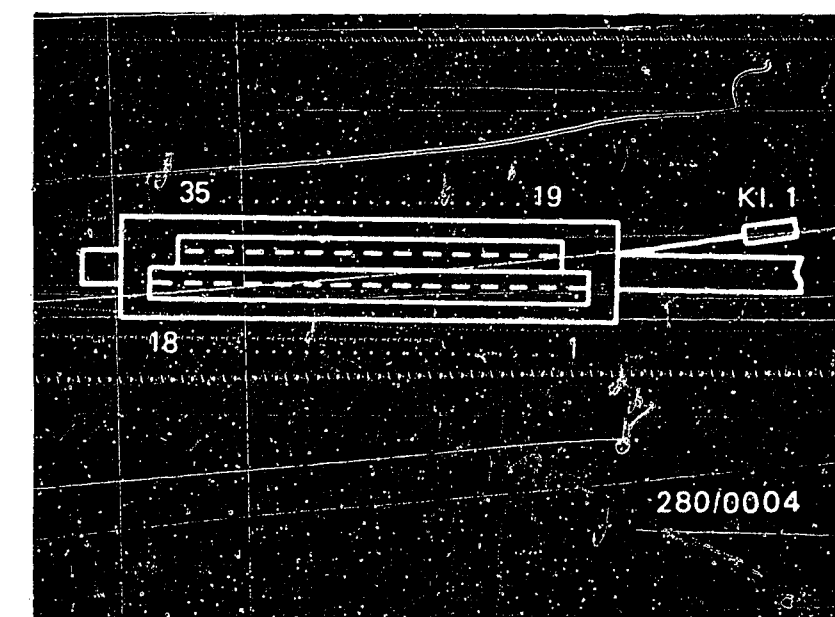


Test step 7			
Operation		Reading	Testing
Program switch position "V":	9	Multimeter must indicate 8 ... 15 V. If reading O.K., continue testing with test step 8.	Component: Control unit, Relay set
Program switch position:	-		Operation: Power supply to 3rd solenoid-operated injection valve
Measuring equipment: Multimeter (Volt range)			
Measuring range: 0 ... 15 V			
Connection Test sockets red (positive) and black			Malfunction: No voltage reading
Operation in vehicle: Ignition "ON"			



Measure voltage on back of
plug.
Relay set
0 332 514 121
a = Jetronic wiring harness
b = Vehicle wiring harness
(No term. 88f on relay set
0 332 514 105)

Top view of multiple plug



Trouble-shooting:

For all voltage measurements:

1. Set value 8 ... 15 V (ignition "ON").
2. Make measurement at the respective component plug.
3. The connector remains plugged onto the relay set.

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω .

Important! Ignition "OFF" and ensure proper electrical connection when measuring.

Continued on C9/C10

C7

Test chart for universal test adapter
BMW 5, 6 and 7 series



C8

Test chart for universal test adapter
BMW 5, 6 and 7 series



Trouble-shooting (continued)

1. Voltage at relay set term. 88e? If not, replace relay set.
2. Test plug-in connection on 3rd solenoid-operated injection valve. If defective, repair plug-in connection.
3. Voltage at injection valve connector term. 40? If not, test lead from injection valve connector to relay set term. 88e.
4. Test lead 32 from injection valve connector to multiple plug term. 32 for continuity.

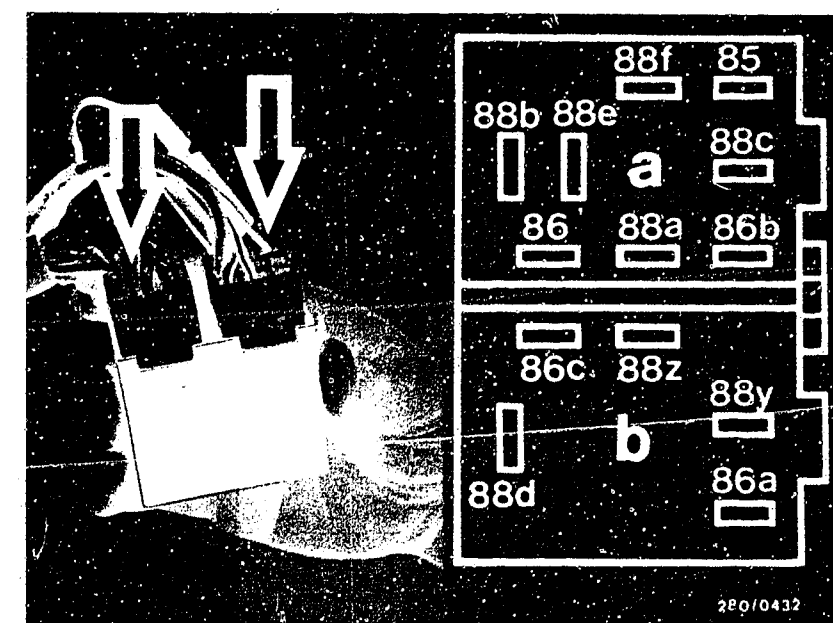
Eliminate contact resistances at the plug-in connections.

Installation position of components:

Relay set: On 5 and 6 series: Near fuse box.
 On 7 series: On firewall, on right-hand side.

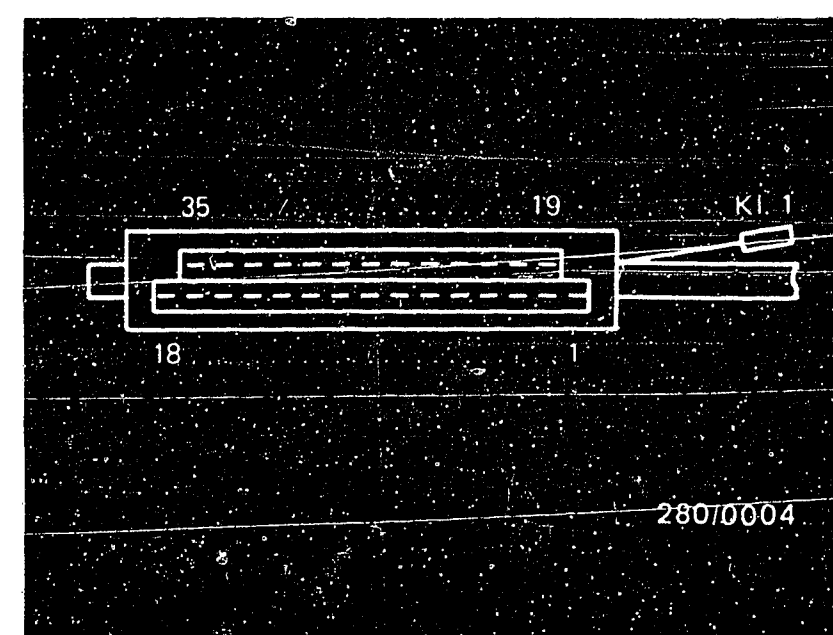
Control unit: On 5 and 6 series: In glove compartment, behind cover.
 On 7 series: Front passenger side, in footwell on right-hand side, behind a cover.

Injection valve: Between intake manifold and engine block.



Measure voltage on back of plug.
 Relay set
 0 332 514 121
 a = Jetronic wiring harness
 b = Vehicle wiring harness
 (No term. 88f on relay set 0 332 514 105)

Top view of multiple plug



Test step 8			
Operation		Reading	Testing
Program switch position "V":	10	Multimeter must indicate 8 ... 15 V. If reading O.K., continue testing with test step 9.	Component: Control unit, Relay set
Program switch position:	-		
Measuring equipment: Multimeter (Volt range)			Operation: Power supply to 4th solenoid-operated injection valve
Measuring range:			
Connection: Test sockets red (positive) and black			Malfunction: No voltage reading
Operation in vehicle: Ignition "ON"			

Trouble-shooting:

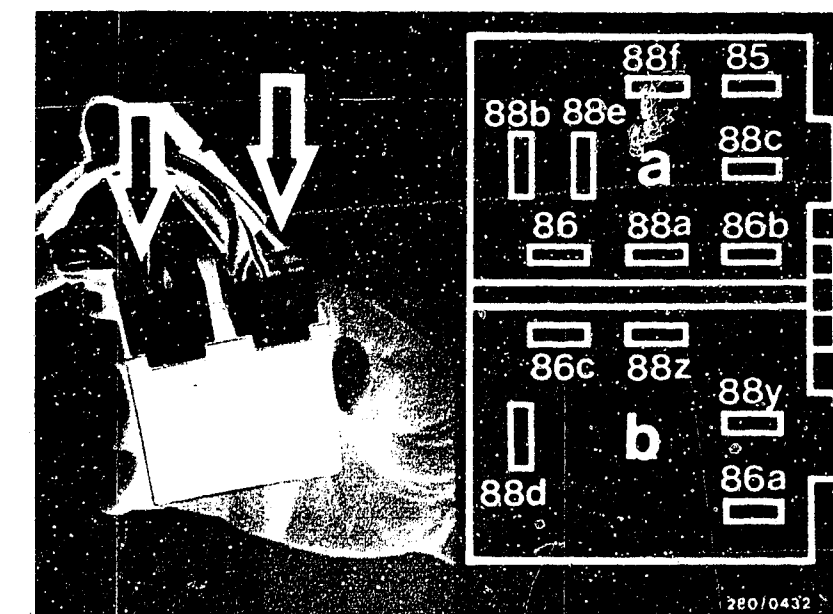
For all voltage measurements:

1. Set value 8 ... 15 V (ignition "ON").
2. Make measurement at the respective component plug.
3. The connector remains plugged onto the relay set.

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω .

Important! Ignition "OFF" and ensure proper electrical connection when measuring.



Measure voltage on back of plug.

Relay set

0 332 514 121

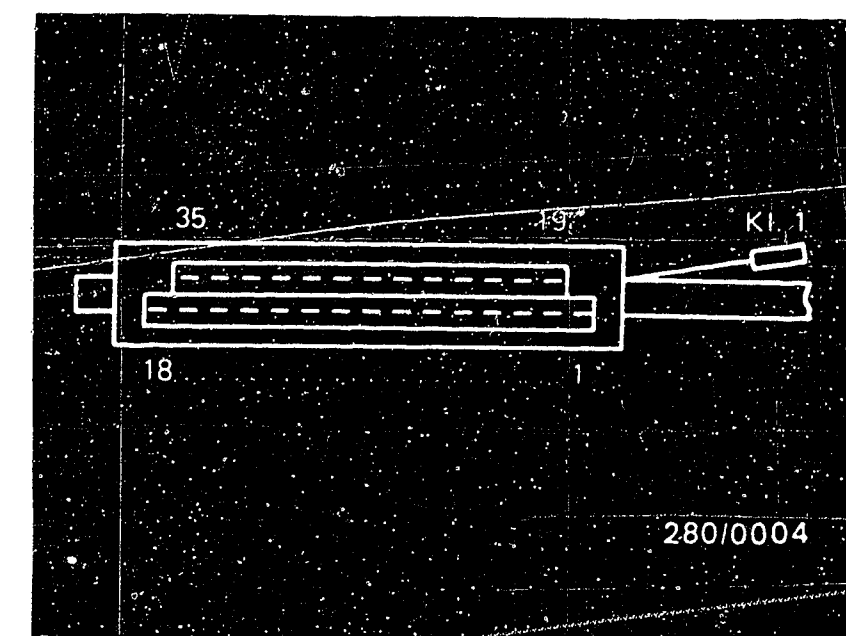
a = Jetronic wiring harness

b = Vehicle wiring harness

(No term. 88f on relay set

0 332 514 105)

Top view of multiple plug



Continued on C13/C14

C11

Test chart for universal test adapter
BMW 5, 6 and 7 series



C12

Test chart for universal test adapter
BMW 5, 6 and 7 series



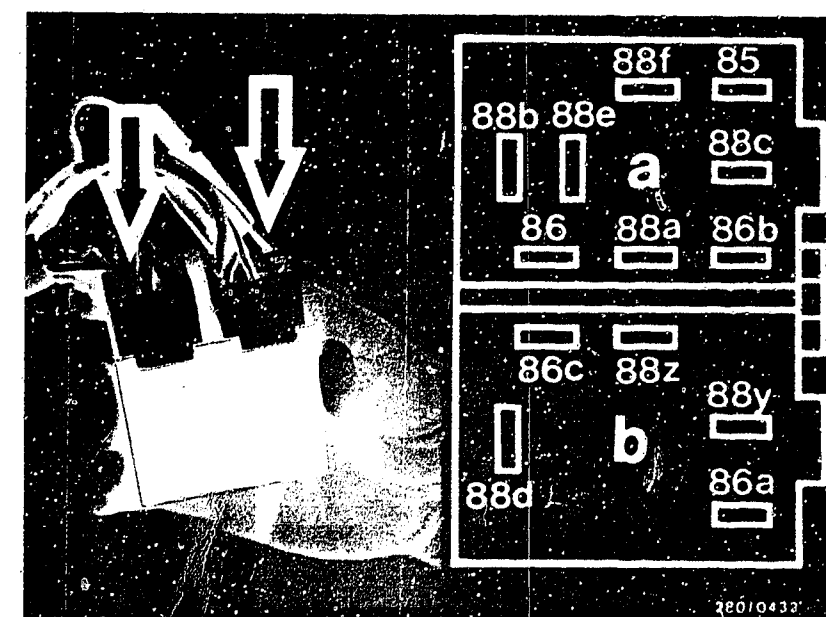
Trouble-shooting (continued)

1. Voltage at relay set term. 88b? If not, replace relay set.
2. Test plug-in connection at 4th solenoid-operated injection valve. If defective, repair plug-in connection.
3. Voltage at injection valve connector term. 41? If not, test lead from injection valve connector to relay set term. 88b.
4. Test lead 14 from injection valve connector to multiple plug term. 14 for continuity.

Eliminate contact resistances at the plug-in connections.

Installation position of components:

- Relay set: On 5 and 6 series: Near fuse box.
On 7 series: On firewall, on right-hand side.
- Control unit: On 5 and 6 series: In glove compartment, behind a cover.
On 7 series: Front passenger side, in footwell on right-hand side, behind a cover.
- Injection valve: Between intake manifold and engine block.



Measure voltage on back of plug.

Relay set

0 332 514 121

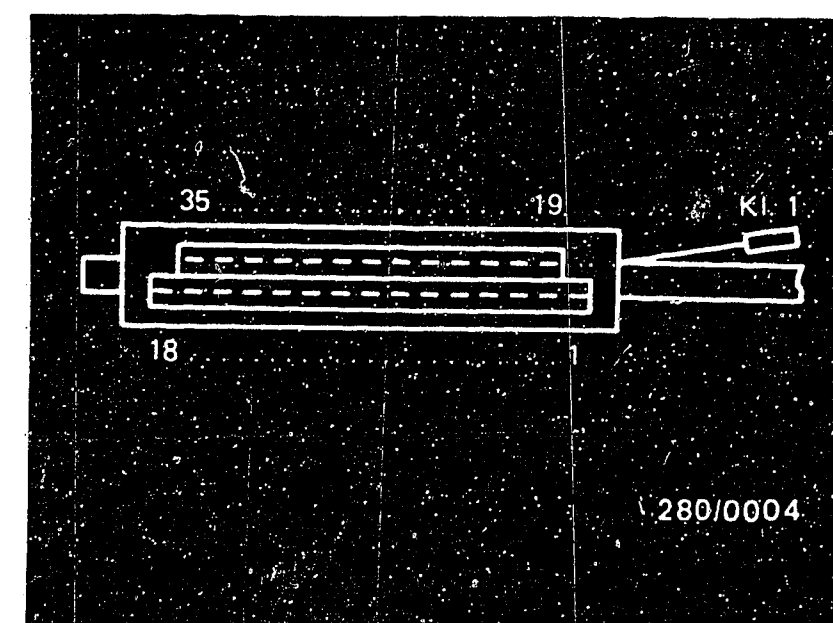
a = Jetronic wiring harness

b = Vehicle wiring harness

(No term. 88f on relay set

0 332 514 105)

Top view of multiple plug



C13

Test chart for universal test adapter
BMW 5, 6 and 7 series



C14

Test chart for universal test adapter
BMW 5, 6 and 7 series



Test step 9			
Operation		Reading	Testing
Program switch position "V":	11	Multimeter must indicate 8 ... 15 V.	<u>Component:</u> Pump contact in air-flow sensor, relay set
Program switch position:	-		
Measuring equipment:			<u>Operation:</u> Power supply to electric fuel pump
Measuring range:			
Connection:			<u>Malfunction:</u> No voltage reading
Operation in vehicle:			
Ignition "ON", deflect air-flow sensor flap			

Trouble-shooting:

For all voltage measurements:

1. Set value 8 ... 15 V (ignition "ON").
2. Make measurement at the respective component plug.
3. The connector remains plugged onto the relay set.

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω.

Important! Ignition "OFF" and ensure proper electrical connection when measuring.

Continued on C17/C18

C15

Test chart for universal test adapter
BMW 5, 6 and 7 series



C16

Test chart for universal test adapter
BMW 5, 6 and 7 series



Trouble-shooting (continued)

1. Voltage at air-flow sensor term. 39? If not, remove plug from air-flow sensor and test lead 39.
2. Test pump contact in air-flow sensor (deflect air-flow sensor flap). Test diode in air-flow sensor between term. 6 and term. 36 (positive pole of ohmmeter to term. 6 of air-flow sensor) set value: approx. 0Ω . With reversed polarity $\infty \Omega$.
3. Test lead 36 between air-flow sensor and relay set.
4. Test lead 20 between control unit and relay set.

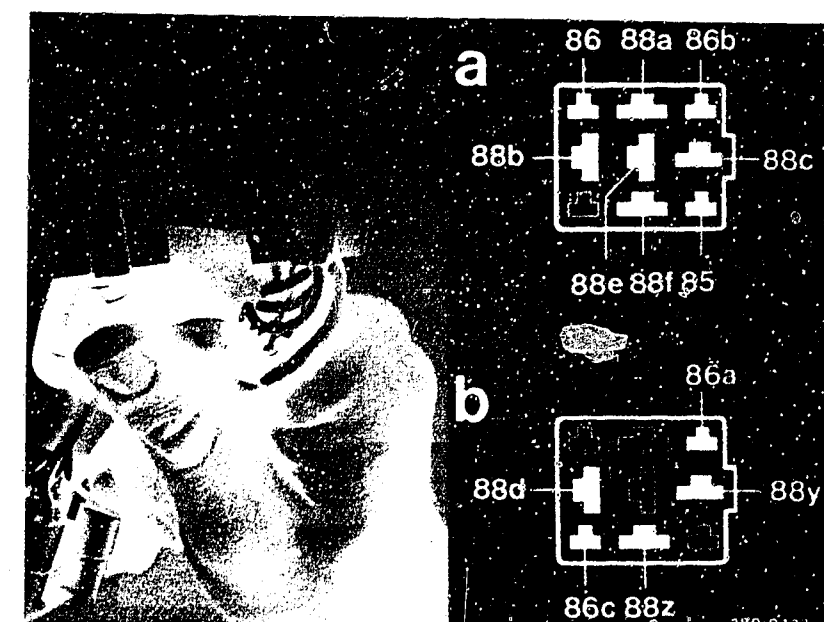
Eliminate contact resistances in the plug-in connections.

Installation position of components:

Relay set: On 5 and 6 series: Near fuse box.
On 7 series: On firewall, on right-hand side.

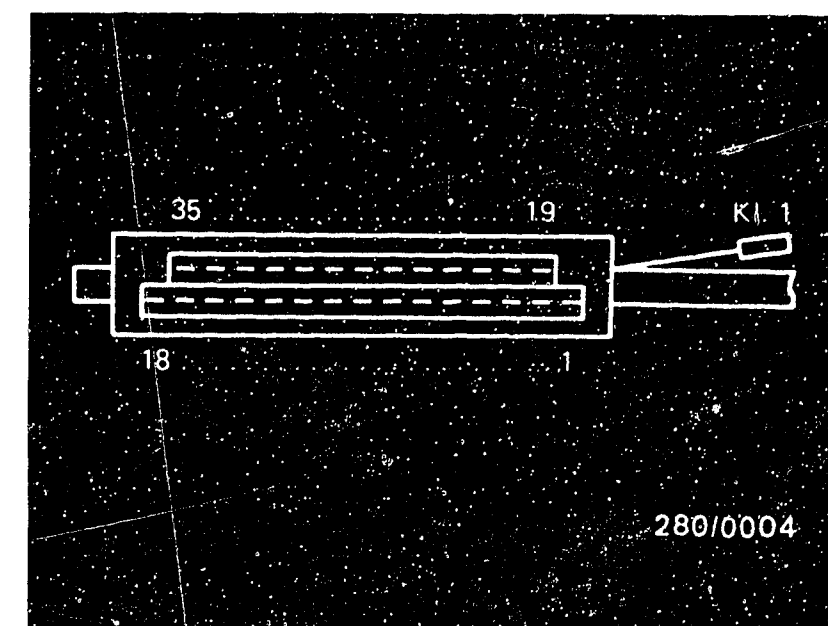
Control unit: On 5 and 6 series: In glove compartment, behind a cover.
On 7 series: Front passenger side, in footwell on right-hand side, behind a cover.

Air-flow sensor: Between air filter and intake manifold on right-hand side.



Relay set removed
Top view of plug
a = Jetronic wiring harness
b = Vehicle wiring harness
(No term. 88f on relay set
0 332 514 105)

Top view of multiple plug



C17

Test chart for universal test adapter
BMW 5,6 and 7 series



C18

Test chart for universal test adapter
BMW 5,6 and 7 series



Test step 10		
Operation	Reading	Testing
Program switch position "V":	12	Multimeter must indicate 8 ... 15 V.
Program switch position:	-	
Measuring equipment: Multimeter (Volt range)	If reading O.K., continue testing with test step 11.	Component: Control unit
Measuring range: 0 ... 15 V		Operation: Triggering of control unit output stage
Connection: Test sockets red (positive) and black		Malfunction: No reading
Operation in vehicle: Ignition "ON"		

Trouble-shooting:

For all voltage measurements:

1. Set value 8 ... 15 V (ignition "ON").
2. Make measurement at the respective component plug.
3. The connector remains plugged onto the relay set.

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary use circuit diagram. Set value approx. 0 Ω .

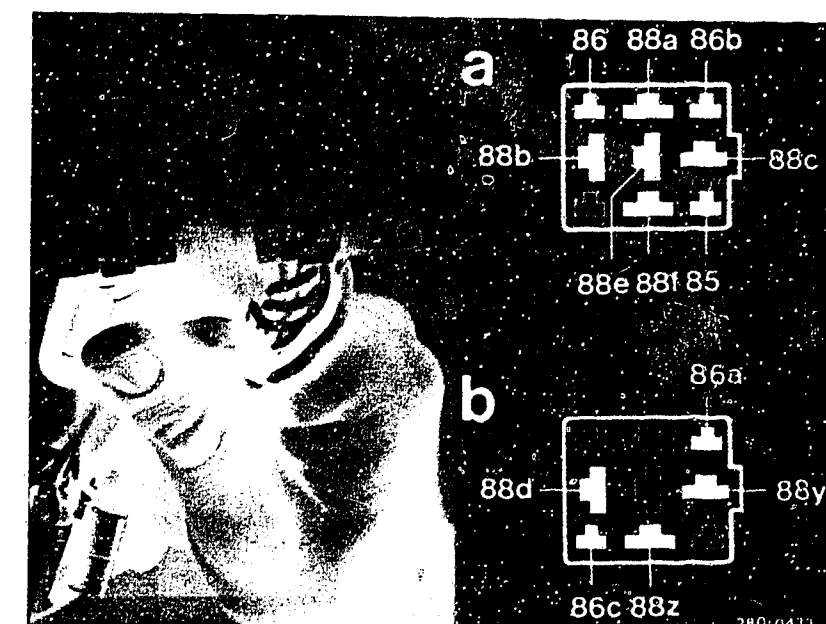
Important! Ignition "OFF" and ensure proper electrical connection when measuring. Test lead from multiple plug term. 29 to relay set term. 88e. If the lead is O.K., but still no reading replace the control unit.

Eliminate contact resistances at the plug-in connections.

Installation position of components

Relay set: On 5 and 6 series: Near fuse box.
On 7 series: On firewall, on right-hand side.

Control unit: On 5 and 6 series: In glove compartment, behind cover.
On 7 series: Front passenger side, in footwell on right-hand side, behind a cover.



Relay set removed

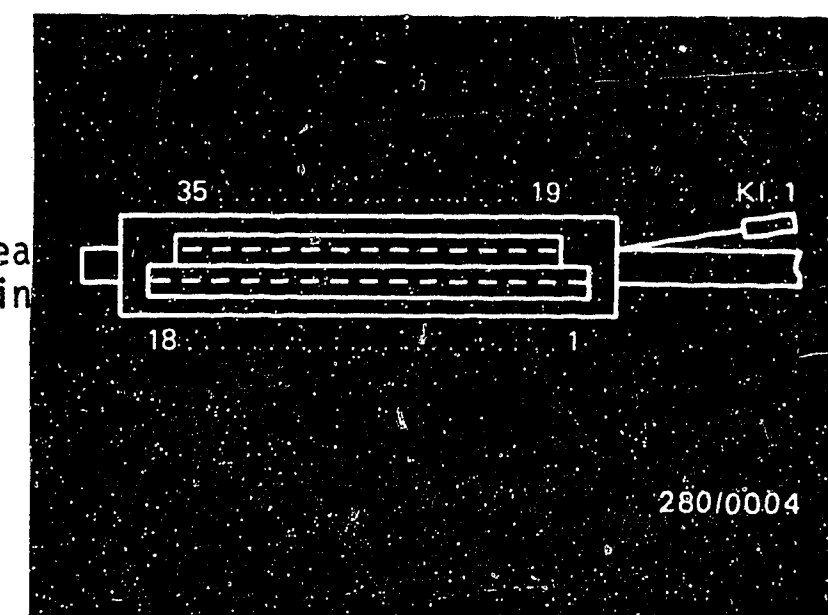
Top view of plug

a = Jetronic wiring harness

b = Vehicle wiring harness

(No term. 88f on relay set
0 332 514 105)

Top view of multiple plug



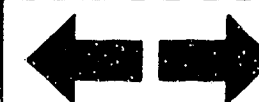
C19

Test chart for universal test adapter
BMW 5, 6 and 7 series



C20

Test chart for universal test adapter
BMW 5, 6 and 7 series



Test step 11			
Operation		Reading	Testing
<u>Program switch position "V":</u>	13	Multimeter must indicate 8 ... 15 V If reading O.K., continue testing with test step 12.	<u>Component:</u> Control unit, Relay set
<u>Program switch position:</u>	-		
<u>Measuring equipment:</u> Multimeter (Volt range)			
<u>Measuring range:</u> 0 ... 15 V			
<u>Connection:</u> Test sockets red (positive) and black			
<u>Operation in vehicle:</u> Ignition "ON"			
			<u>Operation:</u> Power supply to 5th solenoid-operated injection valve
			<u>Malfunction:</u> No voltage reading

Trouble-shooting:

For all voltage measurements:

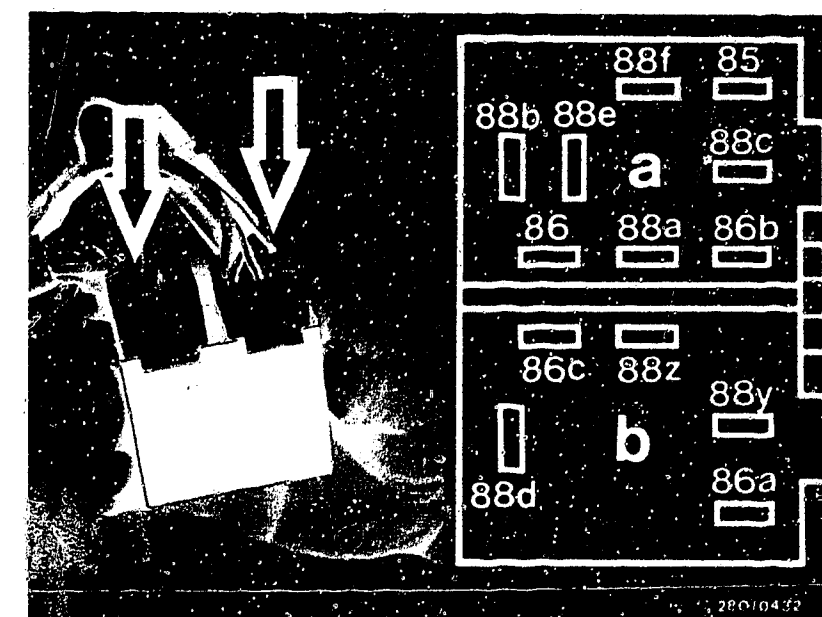
1. Set value 8 ... 15 V (ignition "ON").
2. Make measurement at the respective component plug.
3. The connector remains plugged onto the relay set.

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω .

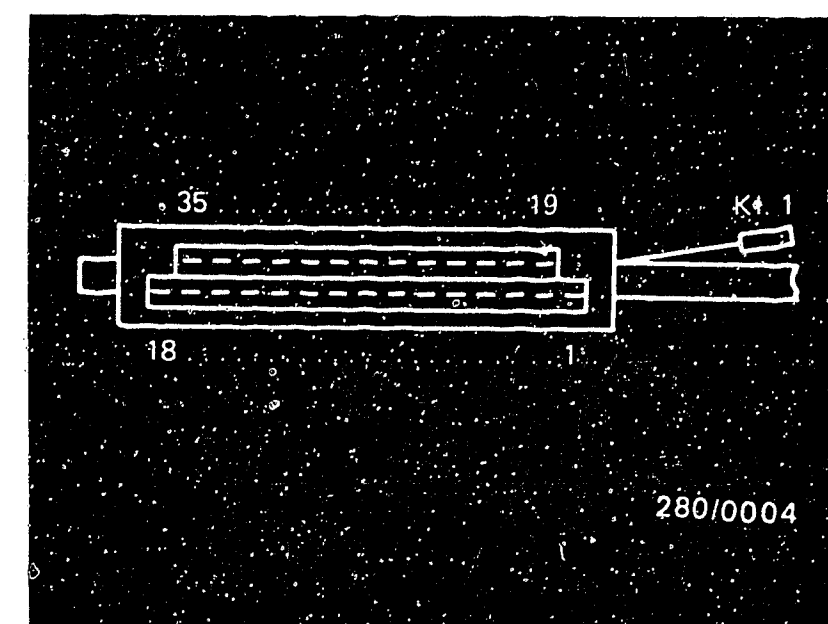
Important! Ignition "OFF" and ensure proper electrical connection when measuring.

Continued on C23/C24



Measure voltage on back of plug.
Relay set
0 332 514 121
a = Jetronic wiring harness
b = Vehicle wiring harness
(No term. 88f on relay set 0 332 514 105)

Top view of multiple plug



C21

Test chart for universal test adapter
BMW 5, 6 and 7 series



C22

Test chart for universal test adapter
BMW 5, 6 and 7 series



Trouble-shooting (continued)

1. Voltage at relay set term. 88b? If not, replace relay set.
2. Test plug-in connection on 5th solenoid-operated injection valve. If defective, repair plug-in connection.
3. Voltage at injection valve connector term. 55? If not, test lead from injection valve connector to relay set term. 88b.
4. Test lead 30 from injection valve connector to multiple plug term. 30 for continuity.

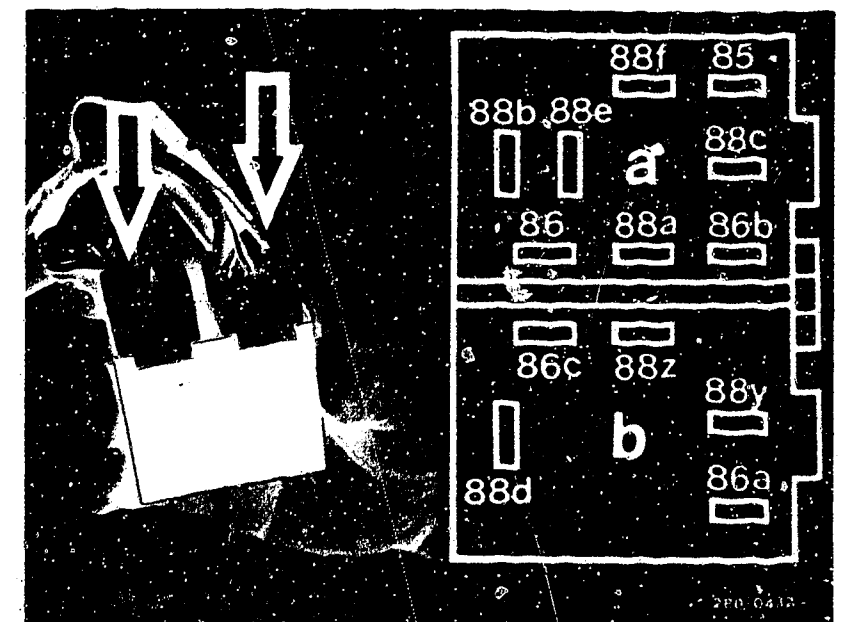
Eliminate contact resistances at the plug-in connections.

Installation position of components:

Relay set: On 5 and 6 series: Near fuse box.
 On 7 series: On firewall, on right-hand side.

Control unit: On 5 and 6 series: In glove compartment, behind cover.
 On 7 series: Front passenger side, in footwell on right-hand side, behind a cover.

Injection valve: Between intake manifold and engine block.



Measure voltage on back of plug.

Relay set

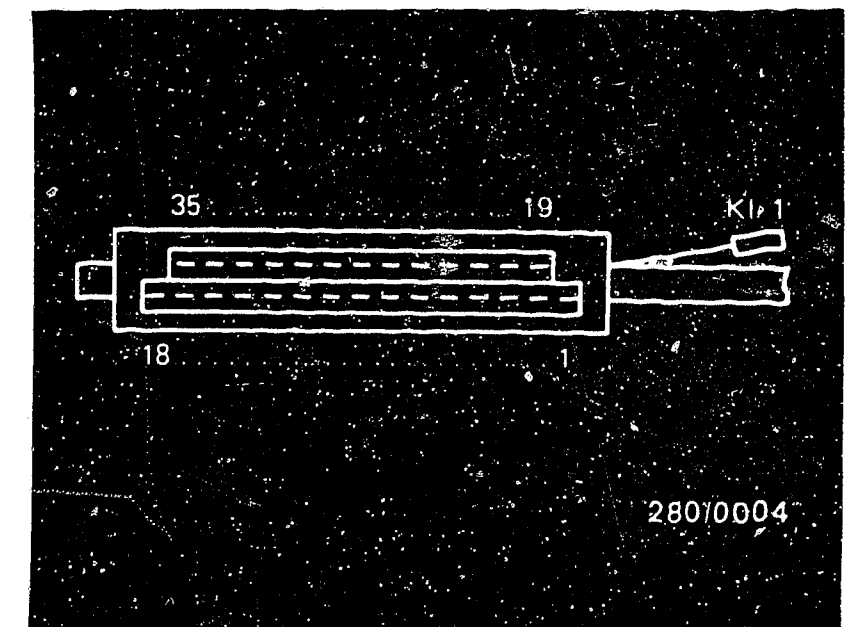
0 332 514 121

a = Jetronic wiring harness

b = Vehicle wiring harness

(No term. 88f on relay set
0 332 514 105)

Top view of multiple plug



C23

Test chart for universal test adapter
BMW 5, 6 and 7 series



C24

Test chart for universal test adapter
BMW 5, 6 and 7 series



Test step 12

Operation

Program switch
position "V":

14

Program switch
position:

-

Measuring equipment:

Multimeter
(Volt range)

Measuring range:

0 ... 15 V

Connection:

Test sockets red (positive)
and black

Operation in vehicle:

Ignition "ON"

Reading

Multimeter must
indicate

8 ... 15 V.

If reading O.K.,
continue testing with
test step 13.

Testing

Component:

Control unit,
Relay set

Operation:

Power supply to 6th solenoid-
operated injection valve

Malfunction:

No voltage reading

Trouble-shooting:

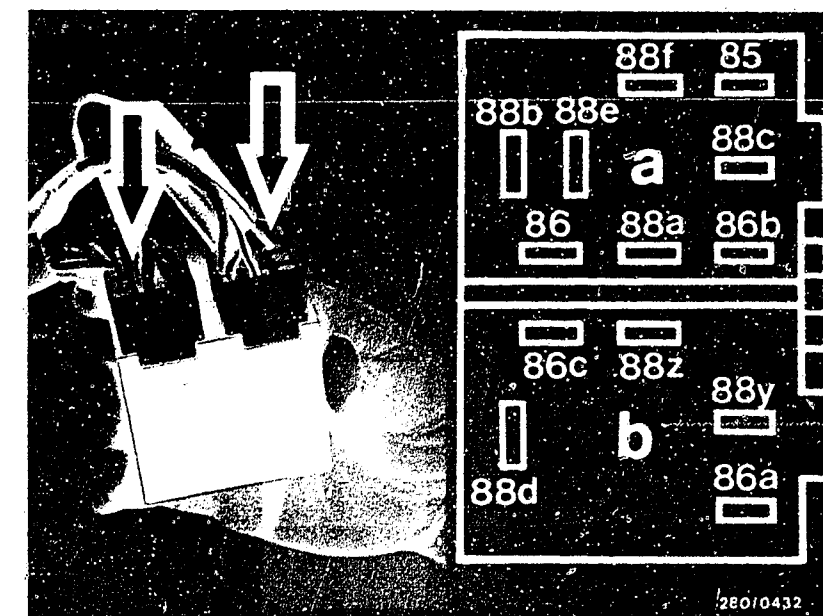
For all voltage measurements:

1. Set value 8 ... 15 V (ignition "ON").
2. Make measurement at the respective component plug.
3. The connector remains plugged onto the relay set.

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω .

Important! Ignition "OFF" and ensure proper electrical connection when measuring.



Measure voltage on back of
plug.

Relay set

0 332 514 121

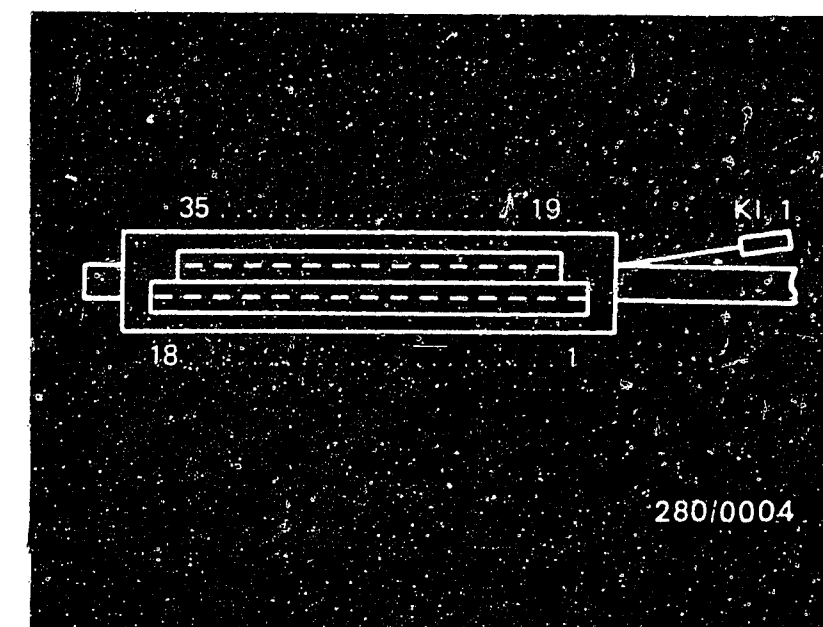
a = Jetronic wiring harness

b = Vehicle wiring harness

(No term. 88f on relay set

0 332 514 105)

Top view of multiple plug



Continued on D3/D4

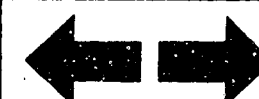
D1

Test chart for universal test adapter
BMW 5, 6 and 7 series



D2

Test chart for universal test adapter
BMW 5, 6 and 7 series



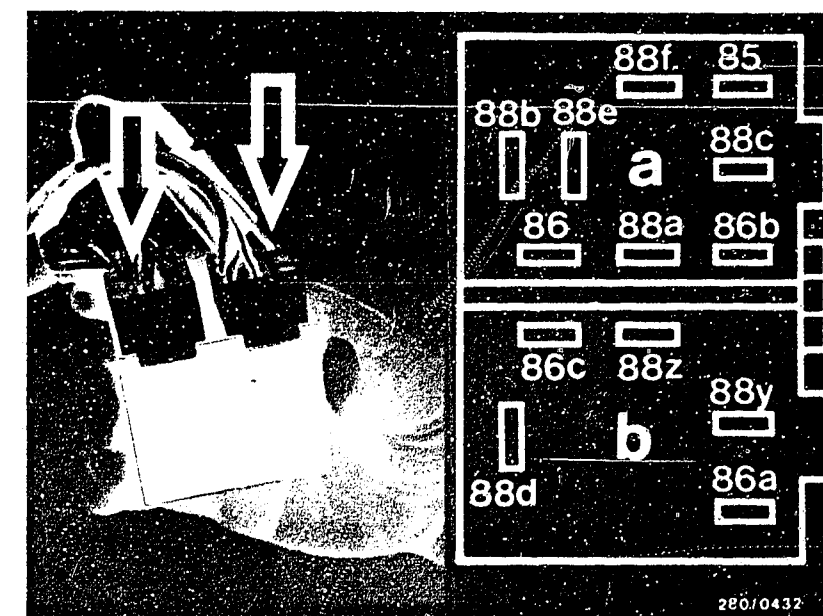
Trouble-shooting (continued)

1. Voltage at relay set term. 88b? If not, replace relay set.
2. Test plug-in connection on 6th solenoid-operated injection valve. If defective, repair plug-in connection.
3. Voltage at injection valve connector term. 56? If not, test lead from injection valve connector to relay set term. 88b.
4. Test lead 31 from injection valve connector to multiple plug term. 31 for continuity.

Eliminate contact resistances at the plug-in connections.

Installation position of components:

Relay set	On 5 and 6 series: Near fuse box. On 7 series: On firewall, on right-hand side.
Control unit:	On 5 and 6 series: In glove compartment, behind cover. On 7 series: Front passenger side, in footwell on right-hand side, behind a cover.
Injection valve:	Between intake manifold and engine block.



Measure voltage on back of plug.

Relay set

0 332 514 121

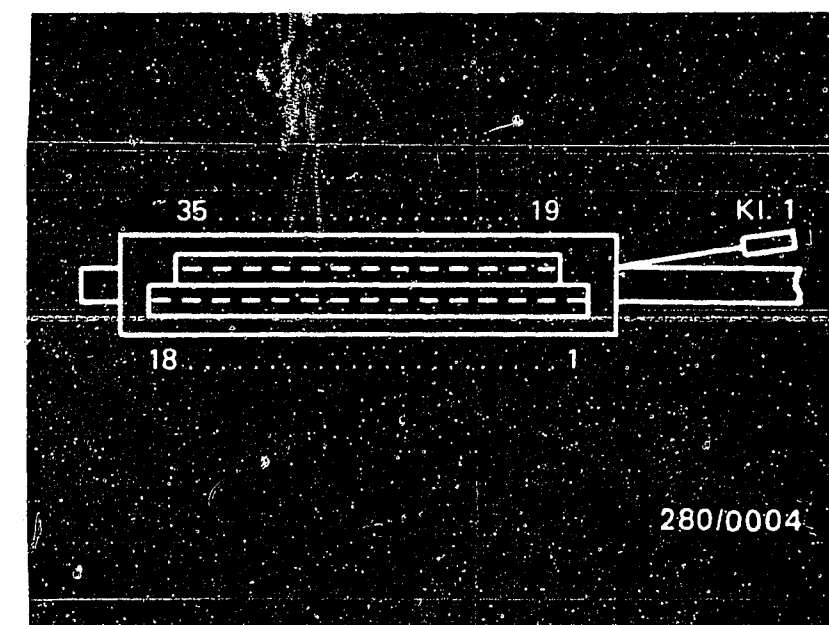
a = Jetronic wiring harness

b = Vehicle wiring harness

(No term. 88f on relay set

0 332 514 105)

Top view of multiple plug



D3

Test chart for universal test adapter
BMW 5, 6 and 7 series



D4

Test chart for universal test adapter
BMW 5, 6 and 7 series



Test step 13		
Operation		Reading
Program switch position "V": ↓		Multimeter must indicate
Program switch position:	6	40...300 Ω 80...600 Ω ①
Measuring equipment: Multimeter (Ω range)		
Measuring range: x 10 Ω		
Connection: Test sockets blue		
Operation in vehicle: Deflect air-flow sensor flap		① as of FD 049
		Component: Air-flow sensor (Potentiometer)
		Operation: Resistance between air-flow sensor term. 7 and central ground
		Malfunction: Resistance outside tolerance

Trouble-shooting:

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω .

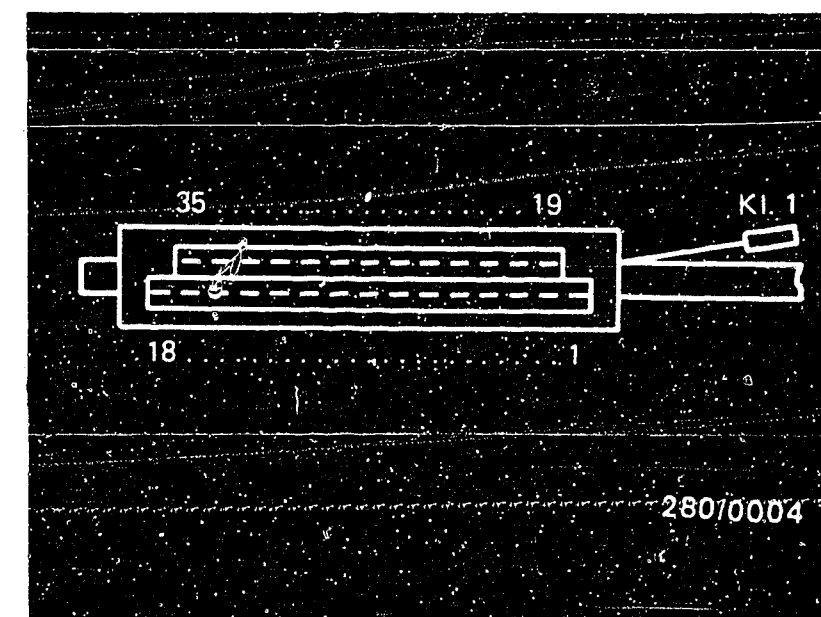
Important! Ignition "OFF" and ensure proper electrical contact when measuring.

From multiple plug term. 7 to air-flow sensor term. 7

From air-flow sensor term. 6 to multiple plug term. 6

From multiple plug term. 5 to central ground.

Eliminate contact resistances in the plug-in connections.



Top view of multiple plug

Installation position of components:

Control unit: On 5 and 6 series:

In glove compartment behind a cover.

On 7 series: Front passenger side, in footwell on right-hand side, behind a cover.

Air-flow sensor: In engine compartment on right-hand side, between air filter and intake manifold.

Central ground: Between 1st and 2nd injection valves.

D5



Test chart for universal test adapter
BMW 5, 6 and 7 series



D6

Test chart for universal test adapter
BMW 5, 6 and 7 series



Test step 14			
Operation		Reading	Testing
Program switch position "V":		Multimeter must indicate <div>130...260 Ω</div> <div>260...520 Ω</div> <div>① </div>	Component: Air-flow sensor
Program switch position:	7		
Measuring equipment: Multimeter (Ω range)			
Measuring equipment: x 10 Ω			
Connection: Test sockets blue			
Operation in vehicle: _____		① As of FD 049	Malfunction: Resistance outside tolerance

Trouble-shooting:

For resistance measurements:

For testing, remove wiring-harness plug from test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω .

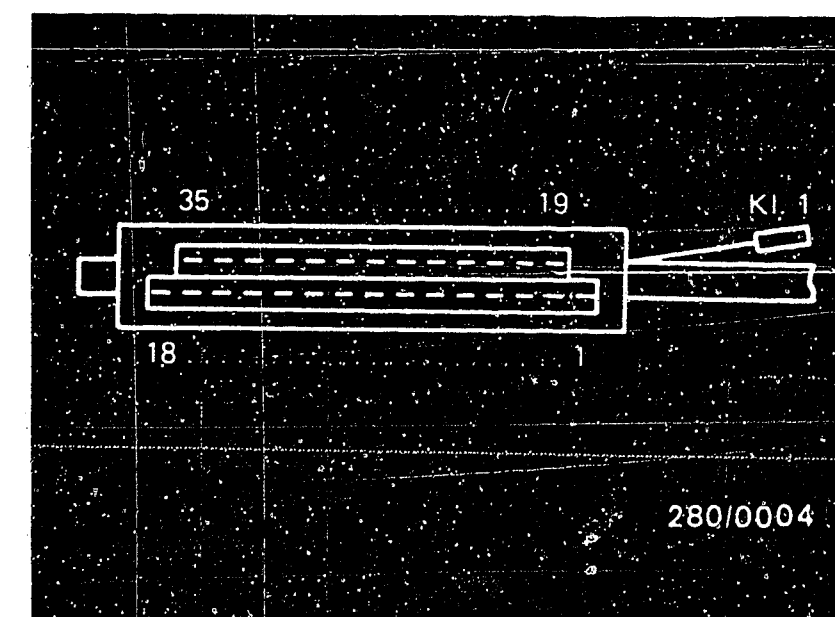
Important! Ignition "OFF" and ensure proper electrical connection when measuring.

From multiple plug term. 8 to air-flow sensor term. 8

From air-flow sensor term. 6 to multiple plug term. 6

From multiple plug term. 5 to central ground.

Eliminate contact resistances in the plug-in connections.



280/0004

Top view of multiple plug.

Installation position of components:

Control unit: On 5 and 6 series:

In glove compartment behind a cover.

On 7 series: Front passenger side, in footwell on right-hand side, behind a cover.

Air-flow sensor: In engine compartment on right-hand side, between air filter and intake manifold.

Central ground: Between 1st and 2nd injection valves.

D7


Test chart for universal test adapter
BMW 5, 6 and 7 series



D8

Test chart for universal test adapter
BMW 5, 6 and 7 series



Test step 15			
Operation		Reading	Testing
<u>Program switch position "V":</u>		Multimeter must indicate	<u>Component:</u> Air-flow sensor
<u>Program switch position:</u>	8	<u>200...400 Ω</u> <u>400...800 Ω</u> ①	
<u>Measuring equipment:</u> Multimeter (Ω range)			<u>Operation:</u> Resistance between air-flow sensor term. 9 and central ground
<u>Measuring range:</u> x 10 Ω			
<u>Connection:</u> Test sockets blue			<u>Malfunction:</u> Resistance outside tolerance
<u>Operation in vehicle:</u> _____		① As of FD 049	

Trouble-shooting:

For resistance measurements:

For testing, remove wiring-harness plug from test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω .

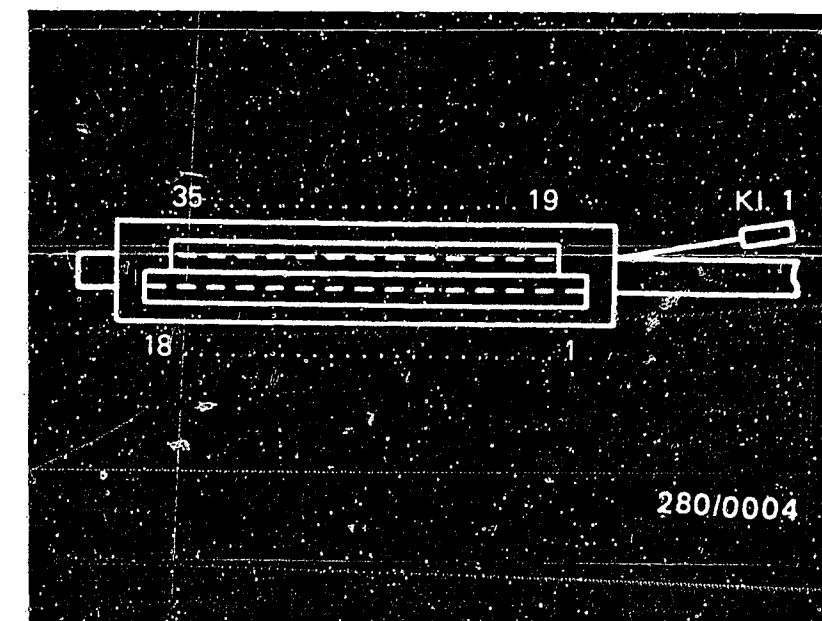
Important! Ignition "OFF" and ensure proper electrical connection when measuring.

From multiple plug term. 9 to air-flow sensor term. 9

From air-flow sensor term. 6 to multiple plug term. 6

From multiple plug term. 5 to central ground.

Eliminate contact resistances in the plug-in connections.



Top view of multiple plug

Installation position of components:

Control unit: On 5 and 6 series:

In glove compartment behind a cover.

On 7 series: Front passenger side, in footwell on right-hand side, behind a cover.

Air-flow sensor: In engine compartment on right-hand side, between air filter and intake manifold.

Central ground: Between 1st and 2nd injection valves.

D9



Test chart for universal test adapter
BMW 5, 6 and 7 series

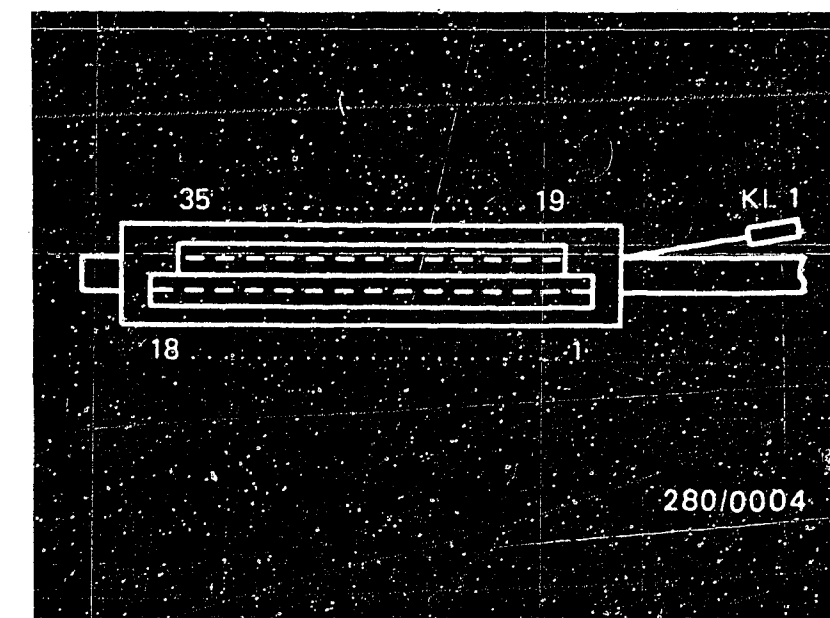


D10

Test chart for universal test adapter
BMW 5, 6 and 7 series



Test step 16			
Operation		Reading	Testing
Program switch position "V":		Multimeter must indicate	Component: Throttle-valve switch (Idle contact)
Program switch position:	9	<u>0...10 Ω.</u>	
Measuring equipment: Multimeter (Ω range)			Operation: Resistance at throttle-valve switch between term. 2 and term. 18
Measuring range: x 1 Ω			
Connection: Test sockets blue			Malfunction: Resistance outside tolerance
Operation in vehicle: Accelerator in rest position			



Top view of multiple plug

Trouble-shooting:

For resistance measurements:

For testing, remove wiring-harness plug from test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω.

Important! Ignition "OFF" and ensure proper electrical connection when measuring.

From multiple plug term. 2 to throttle-valve switch term. 2

From throttle-valve switch term. 18 to multiple plug term. 18

Eliminate contact resistances in the plug-in connections.

Adjusting the throttle-valve switch:

Loosen the fastening screws of the throttle-valve switch slightly.

Connect ohmmeter to throttle-valve switch between term. 2 and term. 18. Turn the throttle-valve switch to the right until the idle contact (microswitch) can be heard to click (reading 0 Ω).

Checking the adjustment: Pull on the throttle cable slightly (open throttle valve slightly). The idle contact must be heard to click (reading ∞ Ω).

Installation position of components:

Throttle-valve switch:

Transverse to the direction of travel, on the throttle-valve assembly.

Control unit:

5 and 6 series: In glove compartment, behind a cover.

7 series: Front passenger side, in footwell on right-hand side, behind a cover.

D11


Test chart for universal test adapter
BMW 5, 6 and 7 series



D12

Test chart for universal test adapter
BMW 5, 6 and 7 series



Test step 17			
Operation		Reading	Testing
<u>Program switch position "V":</u>		Multimeter must indicate	<u>Component:</u> Throttle-valve switch (Full-load contact)
<u>Program switch position:</u>	10	<u>0...10 Ω.</u>	
<u>Measuring equipment:</u> Multimeter (Ω range)			<u>Operation:</u> Resistance at throttle-valve switch between term. 3 and term. 18
<u>Measuring range:</u> x 1 Ω			
<u>Connection:</u> Test sockets blue			
<u>Operation in vehicle:</u> Accelerator in full-load position			
			<u>Malfunction:</u> Resistance outside tolerance

Trouble-shooting:

For resistance measurements:

For testing, remove wiring-harness plug from test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω.

Important! Ignition "OFF" and ensure proper electrical connection when measuring.

From multiple plug term. 3 to throttle-valve switch term. 3

From throttle-valve switch term. 18 to multiple plug term. 18

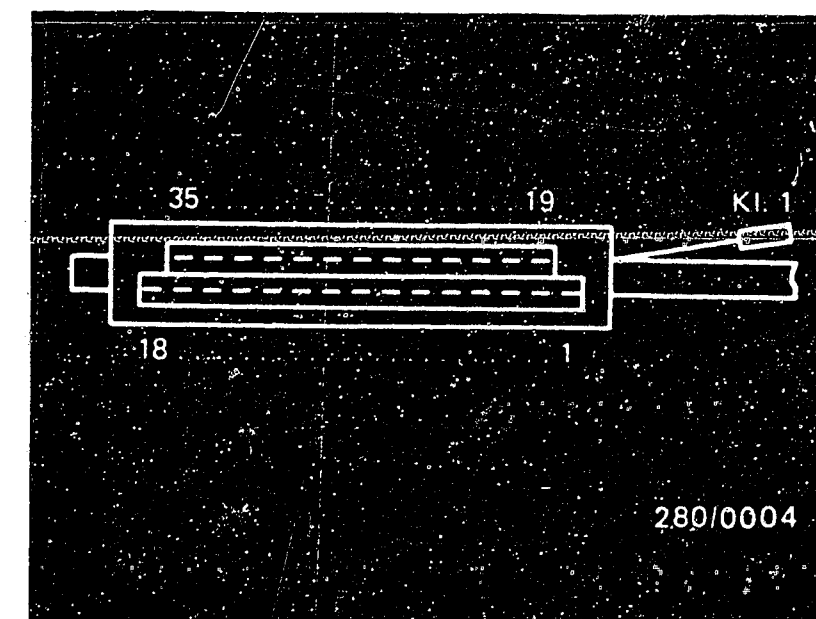
Eliminate contact resistances in the plug-in connections.

Installation position of components:

Throttle-valve switch: Transverse to the direction of travel, on the throttle-valve assembly.

Control unit: On 5 and 6 series: In glove compartment, behind a cover.

On 7 series: Front passenger side, in footwell on right-hand side, behind a cover.



Top view of multiple plug

D 13

Test chart for universal test adapter
BMW 5, 6 and 7 series



D 14

Test chart for universal test adapter
BMW 5, 6 and 7 series



Test step 18			
Operation		Reading	Testing
Program switch position "V":	↓	Multimeter must indicate 30 Ω ...30k Ω (depends on temperature).	Component: Temperature sensor I (Intake air)
Program switch position:	11		Operation: Resistance at air-flow sensor between term. 27 and term. 6
Measuring equipment: Multimeter (Ω range)			Malfunction: Resistance outside tolerance
Measuring range: x 10 Ω or x 100 Ω			
Connection: Test sockets blue			
Operation in vehicle:			

Trouble-shooting:

Measure resistance directly at temperature sensor I (intake air) in air-flow sensor.
At ambient temperature (approx. + 15 ... + 30°C): 1.45...3.3 k Ω

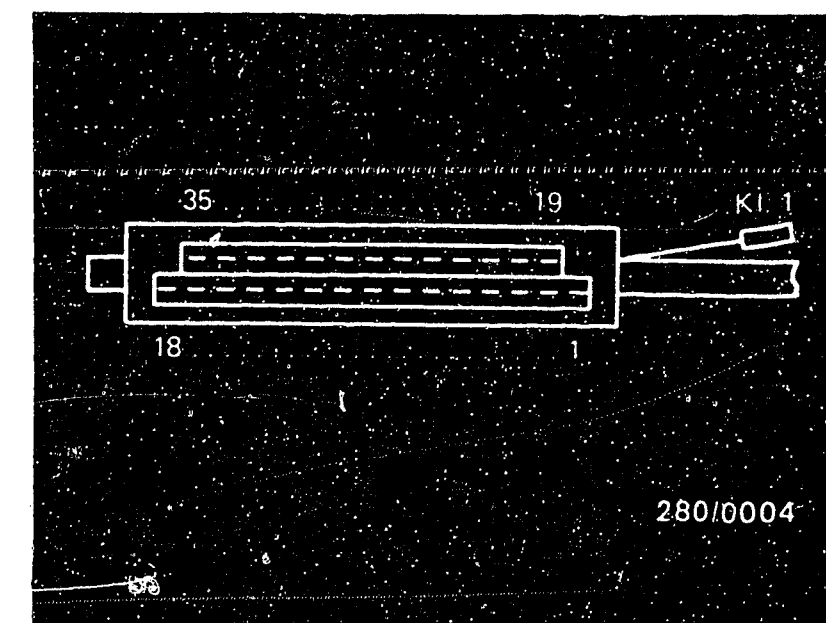
For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω .

Important!

Ignition "OFF" and ensure proper electrical contact when measuring.
From multiple plug term. 27 to air-flow sensor term. 27
From air-flow sensor term. 6 to multiple plug term. 6
From multiple plug term. 5 to central ground.

Eliminate contact resistances in the plug-in connections.



Top view of multiple plug

Installation position of components:

Control unit:

5 and 6 series: In glove compartment, behind a cover.

7 series: Front passenger side, in footwell, on right-hand side, behind a cover.

Air-flow sensor:

On right-hand side in engine compartment, between air filter and intake manifold.

Central ground:

Between 1st and 2nd injection valves.

D 15


Test chart for universal test adapter
BMW 5, 6 and 7 series

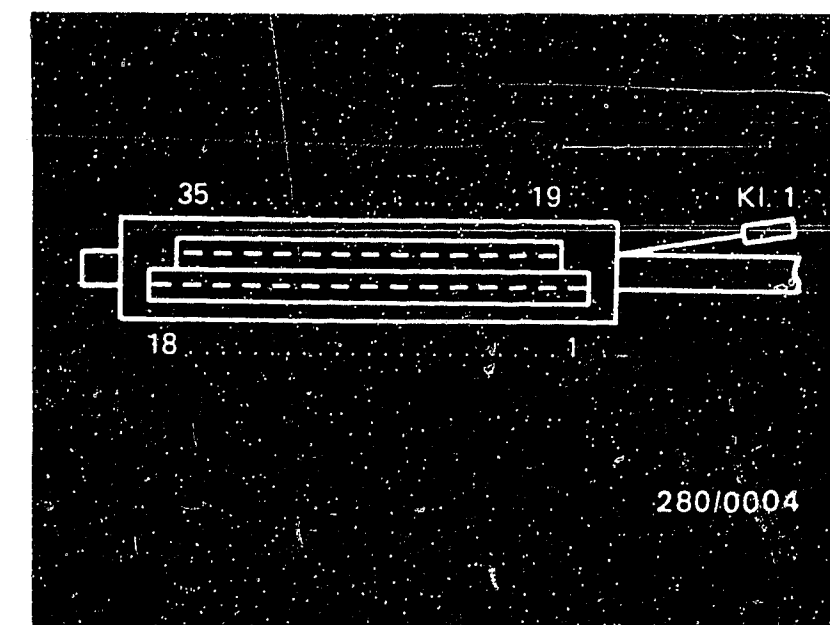


D 16

Test chart for universal test adapter
BMW 5, 6 and 7 series



<u>Test step 19</u>		<u>Reading</u>	<u>Testing</u>
<u>Operation</u>			
<u>Program switch position "V":</u>		Multimeter must indicate	<u>Component:</u> Temperature sensor II (Engine)
<u>Program switch position:</u>	12	<u>30 Ω...30kΩ</u> (depends on temperature).	
<u>Measuring equipment:</u> Multimeter (Ω range)			<u>Operation:</u> Resistance between control unit term. 10 and central ground
<u>Measuring range:</u> x 10 Ω or x 100 Ω			
<u>Connection:</u> Test sockets blue			
<u>Operation in vehicle:</u> _____			<u>Malfunction:</u> Resistance outside tolerance



Top view of multiple plug

Installation position of components:

Control unit:

5 and 6 series: In glove compartment, behind a cover.

7 series: Front passenger side, in footwell, on right-hand side, behind a cover.

Temperature sensor II:

In engine compartment, in cooling water system, at front on engine block.

Central ground:

In engine compartment, center, between 1st and 2nd injection valves.

Trouble-shooting:

Measure resistance directly at temperature sensor II (engine) (white plug):

At ambient temperature (approx. + 15...+ 30°C): 1.3...3.6 kΩ

With engine at normal operating temperature (approx. + 80°C): 250...390 Ω

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω.

Important! Ignition "OFF" and ensure proper electrical contact when measuring.

From multiple plug term. 13 to temperature sensor II (engine) term. 13.

Lead 49 from temperature sensor II to central ground.

Eliminate contact resistances in the plug-in connections.

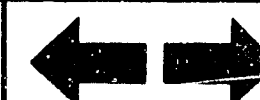
D17

Test chart for universal test adapter
BMW 5, 6 and 7 series

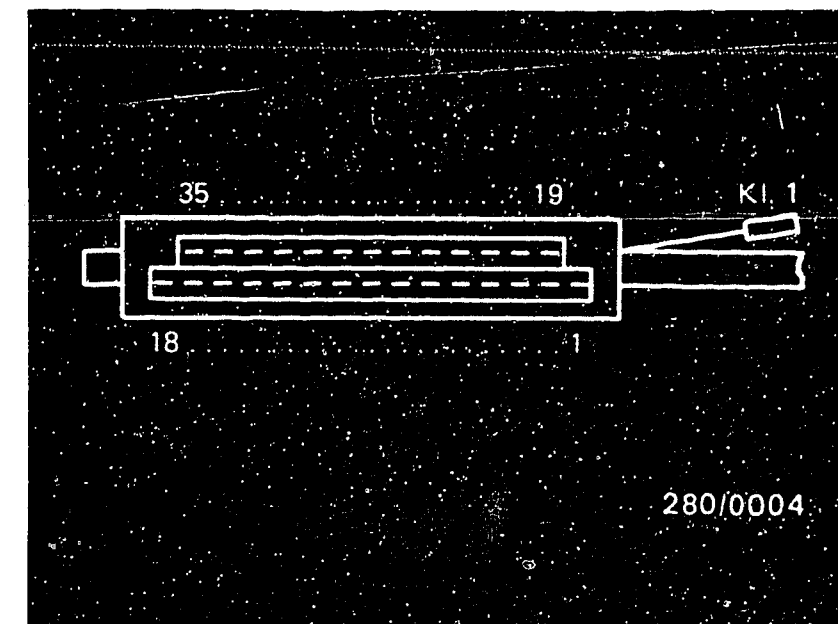


D18

Test chart for universal test adapter
BMW 5, 6 and 7 series



Test step 20		
Operation	Reading	Testing
Program switch position "V": ↓	Multimeter must indicate 0...10 Ω.	Component: Ground connection of output stage
Program switch position: 13		
Measuring equipment: Multimeter (Ω range)		Operation: Ground connection of control unit
Measuring range: x 1 Ω		
Connection: Test sockets blue		Malfunction: Resistance outside tolerance
Operation in vehicle: _____		



Top view of multiple plug

Trouble-shooting:

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω.

Important! Ignition "OFF" and ensure proper electrical contact when measuring.

From multiple plug term. 16 to central ground.

From multiple plug term. 5 to central ground.

Eliminate contact resistances at the plug-in connections.

Installation position of components:

Control unit: On 5 and 6 series: In glove compartment, behind a cover.

On 7 series: Front passenger side, in footwell on right-hand side, behind a cover.

Central ground: Between 1st and 2nd injection valves.

D19

Test chart for universal test adapter

BMW 5, 6 and 7 series





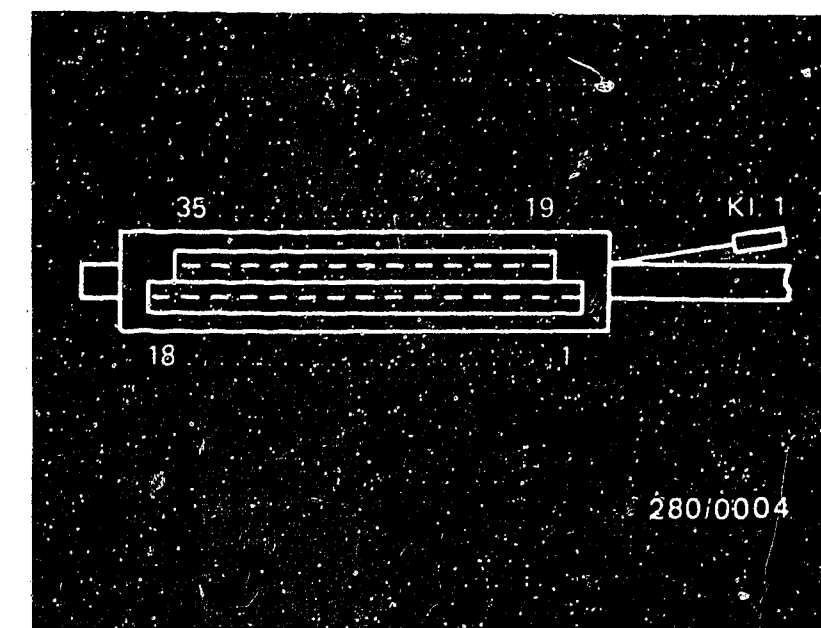
D20

Test chart for universal test adapter

BMW 5, 6 and 7 series



Test step 21			
Operation		Reading	Testing
<u>Program switch position "V":</u>		Multimeter must indicate <u>0...10 Ω.</u> 	<u>Component:</u> Ground connection of output stage
<u>Program switch position:</u>	14		
<u>Measuring equipment:</u> Multimeter (Ω range)			<u>Operation:</u> Ground connection of control unit
<u>Measuring range:</u> x 1 Ω			
<u>Connection:</u> Test sockets blue			<u>Malfunction:</u> Resistance outside tolerance
<u>Operation in vehicle:</u> _____			



Top view of multiple plug

Trouble-shooting:

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω.

Important! Ignition "OFF" and ensure proper electrical contact when measuring.

From multiple plug term. 17 to central ground.

From multiple plug term. 5 to central ground.

Eliminate contact resistances at the plug-in connections.

Installation position of components:

Control unit: On 5 and 6 series: In glove compartment, behind a cover.

On 7 series: Front passenger side, in footwell on right-hand side, behind a cover.

Central ground: Between 1st and 2nd injection valves.

D21

Test chart for universal test adapter

BMW 5, 6 and 7 series



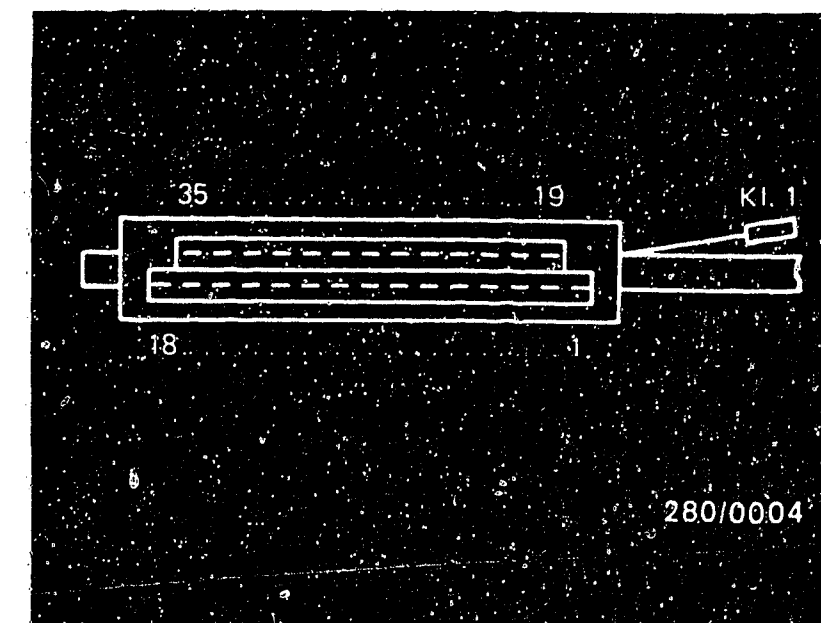
D22

Test chart for universal test adapter

BMW 5, 6 and 7 series



Test step 22		Reading	Testing
Operation			
Program switch position "V":	↓		
Program switch position:	15		
Measuring equipment: Multimeter (Ω range)			
Measuring range: x 1 Ω			
Connection: Test sockets blue			
Operation in vehicle:			



Top view of multiple plug

Trouble-shooting:

For resistance measurements:

For testing, remove wiring-harness plug from the test adapter and, if necessary, use circuit diagram. Set value approx. 0 Ω .

Important! Ignition "OFF" and ensure proper electrical contact when measuring.

From multiple plug term. 35 to central ground.

From multiple plug term. 5 to central ground.

Eliminate contact resistances at the plug-in connections.

Installation position of components:

Control unit On 5 and 6 series: In glove compartment, behind a cover.

On 7 series: Front passenger side, in footwell on right-hand side, behind a cover.

Central ground: Between 1st and 2nd injection valves.

D23

Test chart for universal test adapter
BMW 5, 6 and 7 series



D24

Test chart for universal test adapter
BMW 5, 6 and 7 series



Testing with the universal test adapter is now completed.

The fuel pressure test must now be performed.
If a fault is found during a test, the test must be repeated after the fault has been eliminated.

The fuel pressure test is described on Coordinates E2...E11.

E1

Test chart for universal test adapter
BMW 5, 6 and 7 series



Fuel pressure test

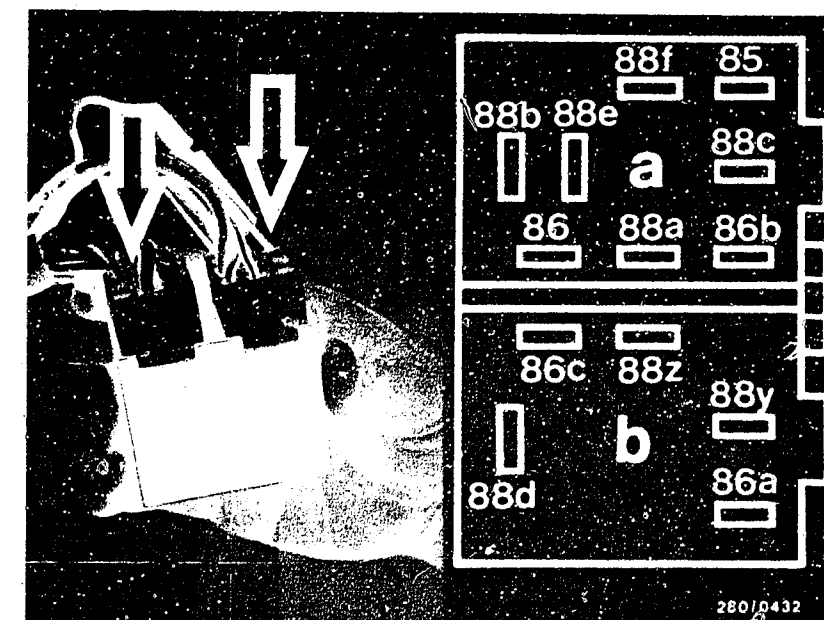
Fuel pump operating? (Listen).
Relay set O.K.?

No

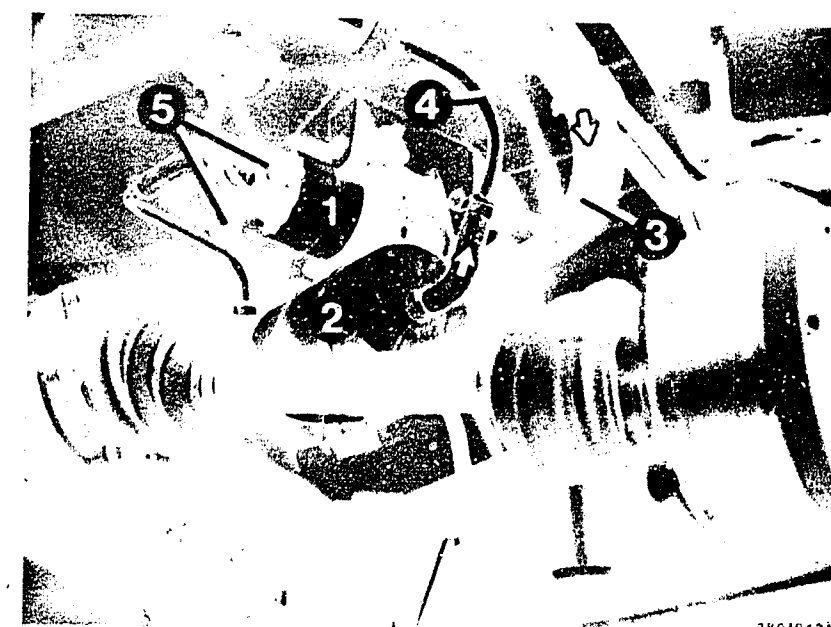
Yes

1. Test relay set.
For testing, screw off relay set and turn round so that connection bases are accessible from below.
Test voltage supply.
Switch on ignition. Using voltmeter, measure battery voltage at term. 88z, 88b, 88e and 88a to vehicle ground. If no voltage, test connecting leads.
Leads O.K.? If yes →
2.
Test resistance at relay set between term. 86b (connection of positive pole) and term. 85.
Test specification:
Relay set:
0 332 514 121: 70...500 Ω
0 332 514 105: 50...110 Ω
Test specification O.K.? If yes →
3. Start engine. Test voltage at disconnected pump plug (set value min. 12 V). If no voltage:
Test voltage at pump fuse in central fuse box and relay set term. 88y and 88d.
Voltage at term. 88y → replace pump fuse.
No voltage at term. 88d → replace relay set.

Continued on E4/E5



Measure voltage on back of plug.
Relay set
0 332 514 121
a = Jetronic wiring harness
b = Vehicle wiring harness
1 = Electric fuel pump
2 = Fuel filter
3 = Fuel intake line
4 = Fuel delivery line
5 = Fuel pump plug
Arrow = Direction of fuel flow



E2

Fuel pressure test
BMW 5, 6 and 7 series



E3

Fuel pressure test
BMW 5, 6 and 7 series



Fuel pressure test (continued)

Fuel pump operating? (Listen)
Relay set O.K.? (Continued)

Yes

No

4. Ground connection of fuel pump O.K.?
If not → check ground terminal (remove rear seat bench. Ground point on body in left-hand recess) and check ground lead for open circuit and proper connection.
Fuel pump operating? If not →
5 Start engine. Test voltage at disconnected pump plug. (Set value min. 12 V). If voltage, replace fuel pump.

Fuel pressure O.K.?

Test specification:
2.3...2.7 bar

Test specification reached?

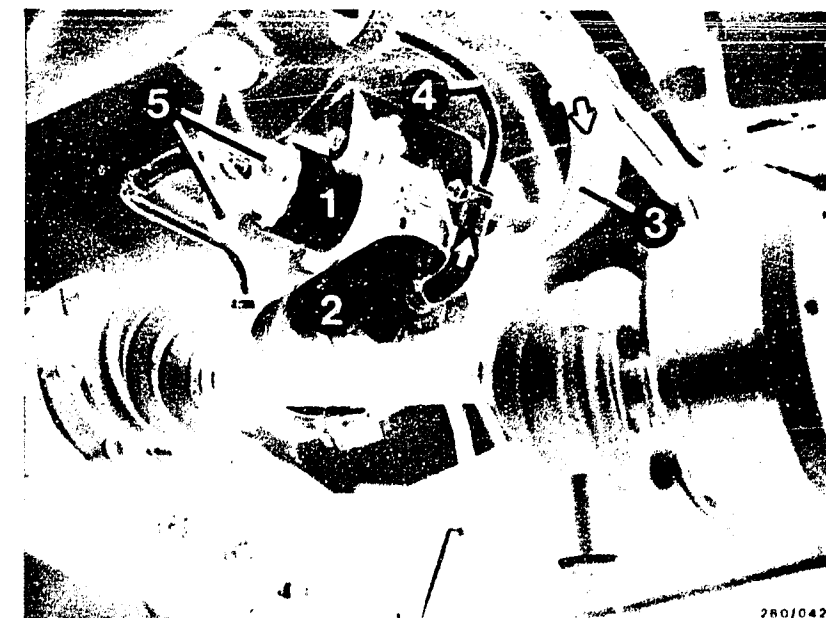
No

Testing: Remove hose from start valve.
Connect pressure gauge.
Caution: When removing the fuel hose make sure that no fuel gets onto hot parts of the engine.

Yes

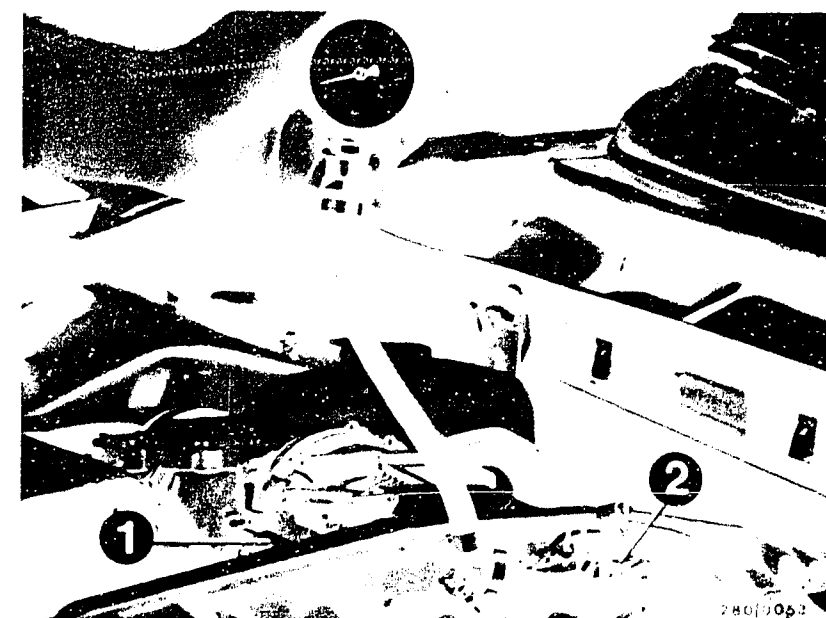
Yes

Continued on E6/E7



1 = Fuel pump
5 = Fuel pump plug
Arrow = Direction of fuel flow

1 = Air hose to intake manifold
2 = Start valve



E4

Fuel pressure test
BMW 5, 6 and 7 series



E5

Fuel pressure test
BMW 5, 6 and 7 series



Fuel pressure test (continued)

Fuel pressure O.K.?

Test specification:

2.3...2.7 bar

Test specification
reached?

No

Testing the fuel pressure

Connect the connections of the pressure testers into the fuel delivery line on the start valve. If using pressure tester KDJE-P 100, close the hollow screw.

Plug the end of the hose onto the start valve, and plug the Y-piece onto the hose to the fuel-distribution pipe.

Make sure there are no leaks.

Remove the hose between air filter and air-flow sensor. Switch on ignition.

Slightly deflect air-flow sensor flap.

(Pump contact must close).

Fuel pump must operate.

Fuel pump pressure

2.3...2.7 bar

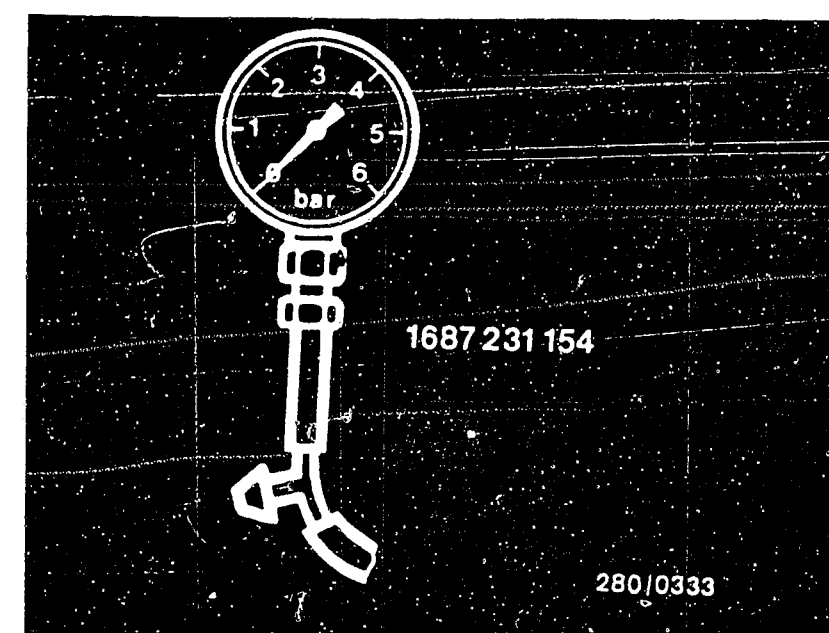
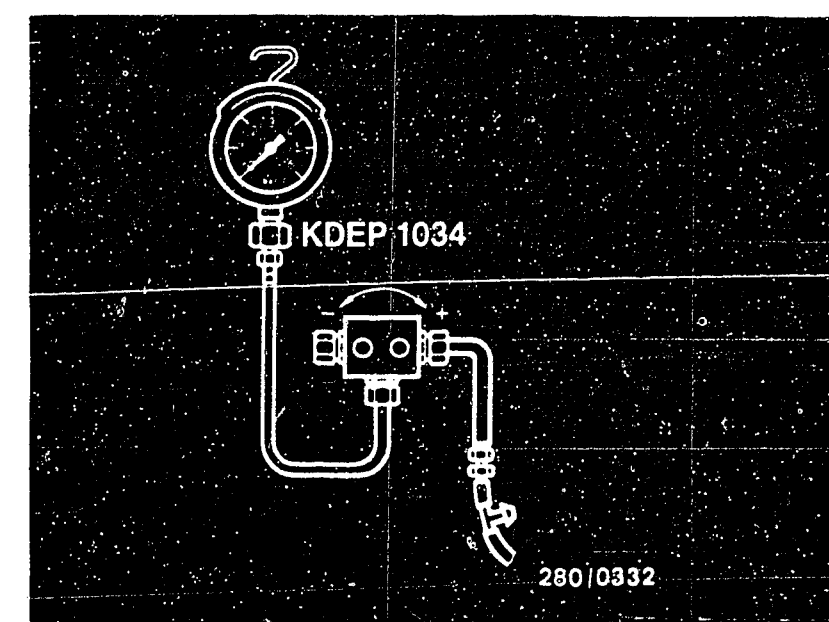
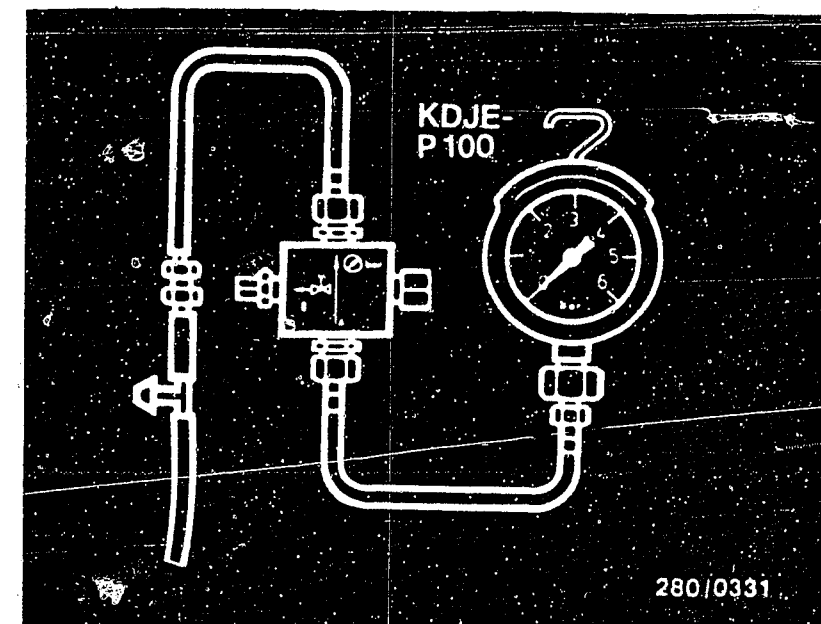
Let engine idle →

Fuel pump pressure approx. 2.0 bar.

Yes

Yes

Continued on E8/E9



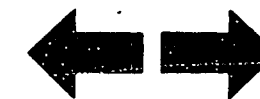
E6

Fuel pressure test
BMW 5, 6 and 7 series



E7

Fuel pressure test
BMW 5, 6 and 7 series



Fuel pressure test (continued)

Fuel pressure O.K.?

Test specification:

2.3...2.7 bar

Pressure regulator O.K.?

Test specification reached?

No

Testing the pressure regulator

Unscrew hose between air filter and air-flow sensor. Switch on ignition. Slightly deflect air-flow sensor flap (pump contact must close). Electric fuel pump must operate.

Fuel pump pressure
2.3...2.7 bar

Fuel pressure of 2.3 bar not reached:

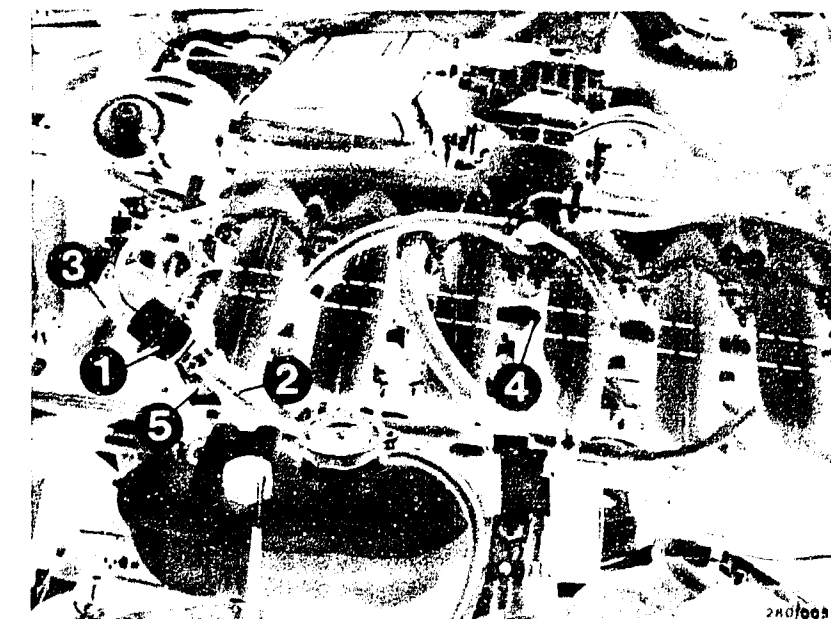
1. Slowly pinch off fuel return line: (Caution: Do not load pressure gauge above 6 bar). Pressure rises above 4 bar → replace pressure regulator. Pressure remains below 4 bar → replace fuel pump.
2. Check fuel delivery line and fuel filter for throughflow.
3. Strainer in tank clogged.
4. Corrosion in tank.

Fuel pressure of 2.7 bar exceeded:

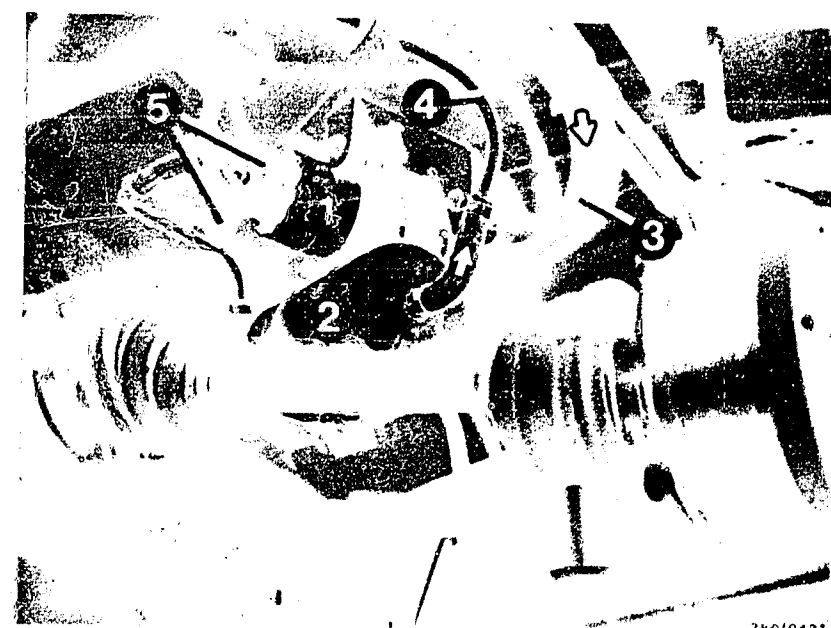
1. Fuel return line clogged or pinched.
2. Replace pressure regulator.

After testing is completed, refit the pipe piece between air filter and air-flow sensor. Check the connection for leaks and check the ground connection (ground lead) on the air-flow sensor.

Yes



- 1 = Pressure regulator
 - 2 = Fuel return line
 - 3 = Air hose to intake manifold
 - 4 = Fuel-distribution pipe
 - 5 = Bracket
-
- 1 = Fuel pump
 - 2 = Fuel filter
 - 3 = Fuel intake line
 - 4 = Fuel delivery line
 - 5 = Fuel pump plug
- Arrow = Direction of fuel flow



Continued on E10/E11

E8

Fuel pressure test
BMW 5, 6 and 7 series



E9

Fuel pressure test
BMW 5, 6 and 7 series



Fuel pressure test (continued)

Does fuel pressure remain constant after the engine has started?

No

Test pump contact in air-flow sensor:

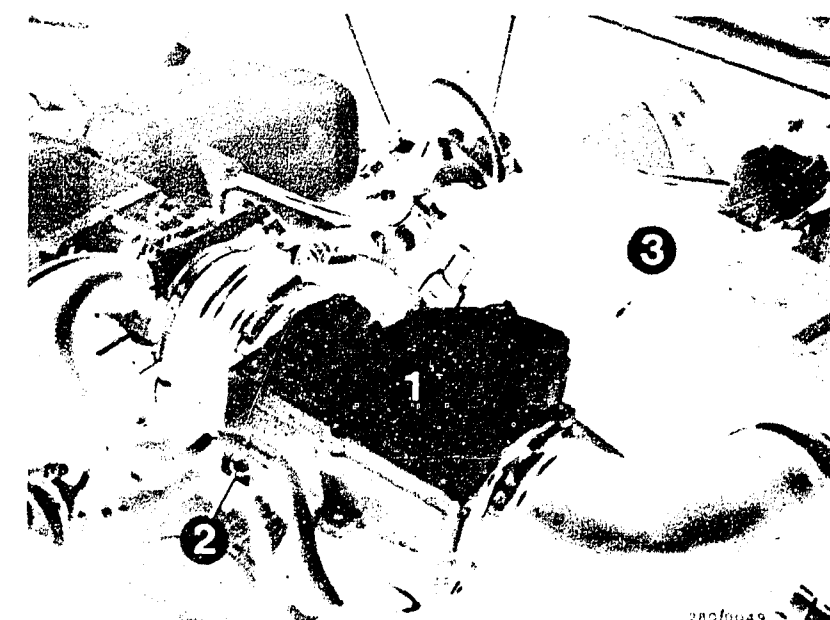
Remove air hoses and plug. Connect ohmmeter to term. 36 and term. 39 of air-flow sensor. Open air-flow sensor flap slightly by hand. Reading must change from $\infty \Omega$ to 0Ω . If this is not the case, renew the air-flow sensor.

Yes

The fuel pressure test is now completed. If the fault has not been found or if you require further information and instructions on how to remedy the fault, continue with the trouble-shooting program of your choice.

Detailed trouble-shooting → see B 3

Direct trouble-shooting → see B 5



- 1 = Air-flow sensor
- 2 = Bypass screw (turning in clockwise direction = lower CO concentration)
- 3 = Air filter

E10

Fuel pressure test
BMW 5, 6 and 7 series



E11

Fuel pressure test
BMW 5, 6 and 7 series



Trouble-shooting according to customer complaints

How to use the following trouble-shooting program

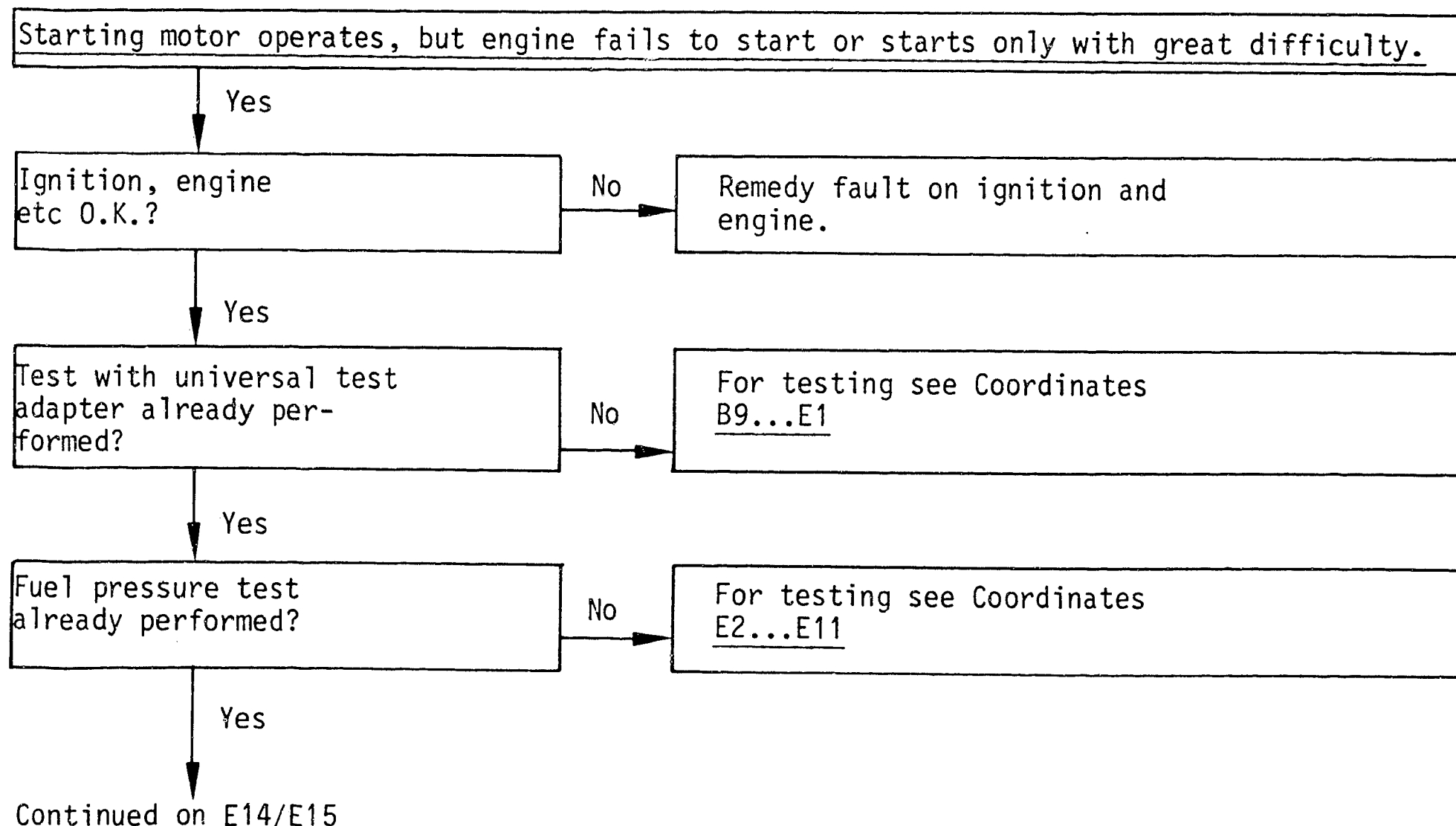
The program is divided into three rows of boxes:

1. The left-hand row contains the questions on the tests.
2. The middle row contains descriptions of the testing and adjustment operations on the components.
3. The right-hand row contains the illustrations belonging to the text and explains the illustrations.

If the questions can be answered conclusively with "yes" without testing, proceed to the next question below.

If, on the other hand, the answer to the question is "no", and you suspect a fault, branch to the middle row of boxes and carry out the tests given there.

When you have finished testing continue trouble-shooting at the point at which you branched off.

**E12**

Engine fails to start
BMW 5, 6 and 7 series

**E13**

Engine fails to start
BMW 5, 6 and 7 series



Starting motor operates, engine fails to start or starts only with great difficulty
(Continued)

Start valve O.K.?

No

Functional test: (Values in parentheses apply only to thermo-time switch 0 280 130 219)

Test power supply to start valve when starting. To do this, remove plug from start valve and connect voltmeter to term. 46 and term. 45/term. 47 of start valve plug.

Coolant at ambient temperature below +30°C (+10°C):

Voltage reading min. 6 V

Coolant temperature above +40°C (+20°C):

Voltage reading approx. 0 V

Test the following leads for continuity with ohmmeter (set value approx. 0 Ω).

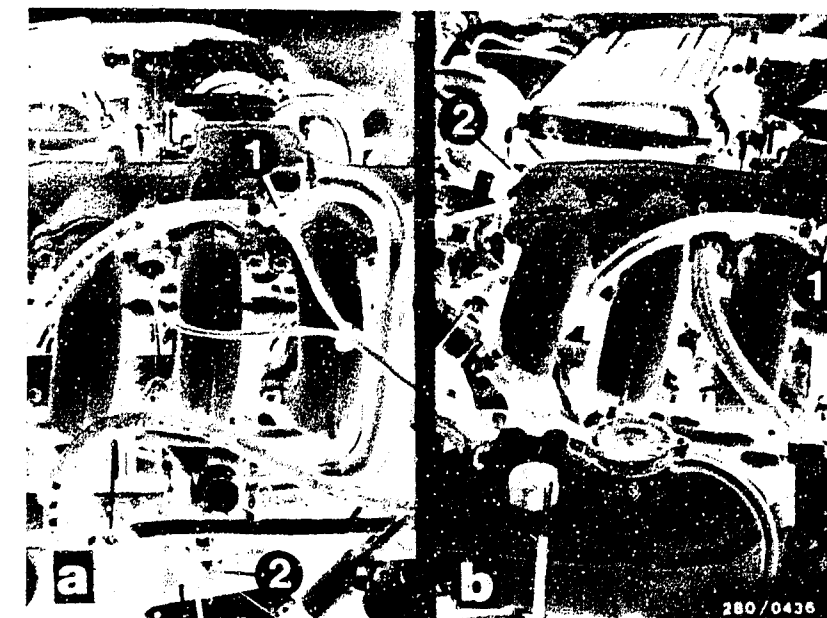
- Lead from start valve term. 46 to thermo-time switch term. W.
- Lead from start valve term. 45 to thermo-time switch term. G.
- Lead from start valve term. 47 to relay set term. 86.

Check ground connection of thermo-time switch.

Yes

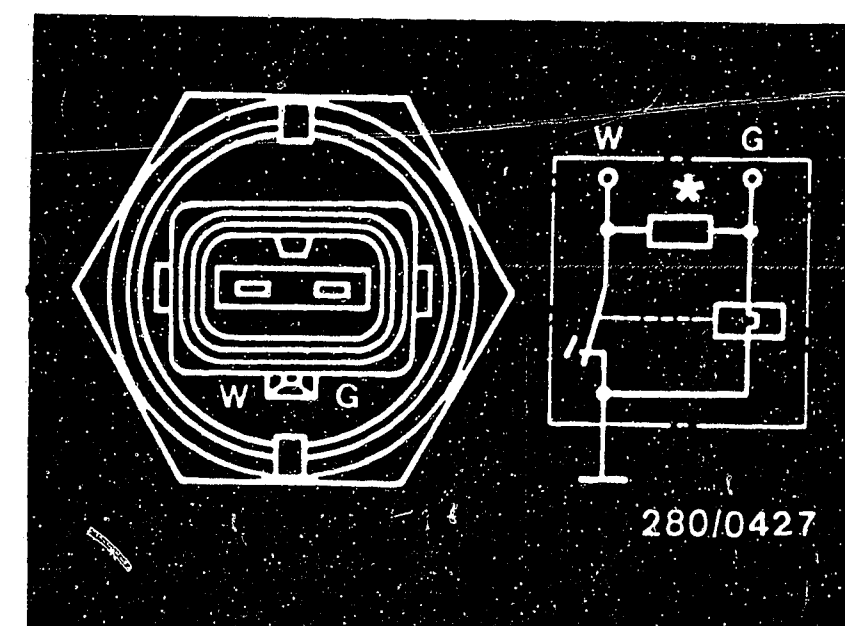
Yes

Continued on E16/E17



- 1 = Start valve (blue plug)
2 = Thermo-time switch (brown plug)
a = Up to 7.79
b = As of 8.79

*Not on 0 280 130 219



E14

Engine fails to start
BMW 5, 6 and 7 series



E15

Engine fails to start
BMW 5, 6 and 7 series



Starting motor operates, engine fails to start or starts only with great difficulty
(Continued)

Electrical test of start valve:

Connect ohmmeter to start valve (remove plug): Set value approx. $4\ \Omega$.

Mechanical test of start valve:

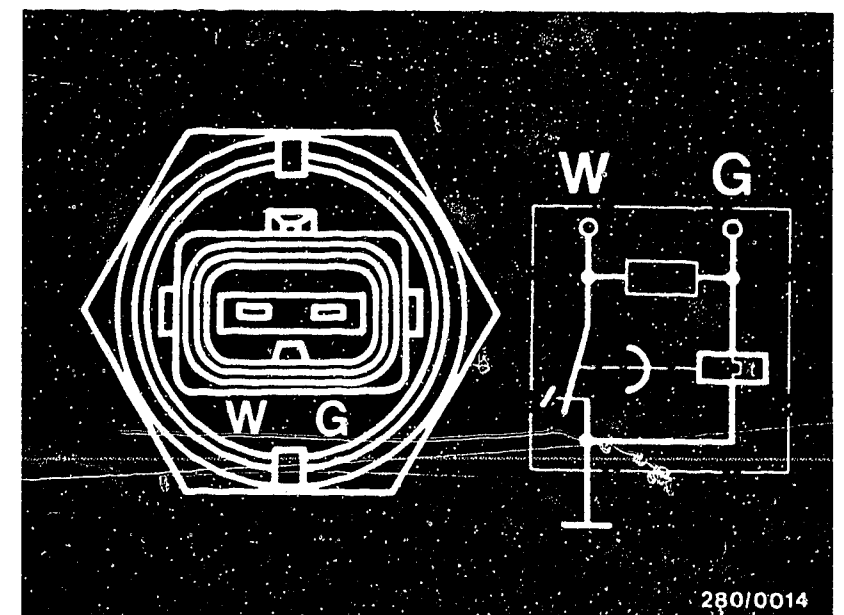
Remove start valve from intake manifold and hold in a container. (Caution! Fire hazard!). When starting at an ambient temperature below $+30^{\circ}\text{C}$ ($+10^{\circ}\text{C}$) the start valve must squirt (max. 8 sec.). With the engine at normal operating temperature above $+40^{\circ}\text{C}$ ($+20^{\circ}\text{C}$) the start valve must not squirt. With the ignition switched on and the pressure built up the start valve must likewise not squirt.

Carry out squirt test for engine at normal operating temperature above $+40^{\circ}\text{C}$ ($+20^{\circ}\text{C}$) as follows: Remove plug from thermo-time switch and ground term. W.

Yes

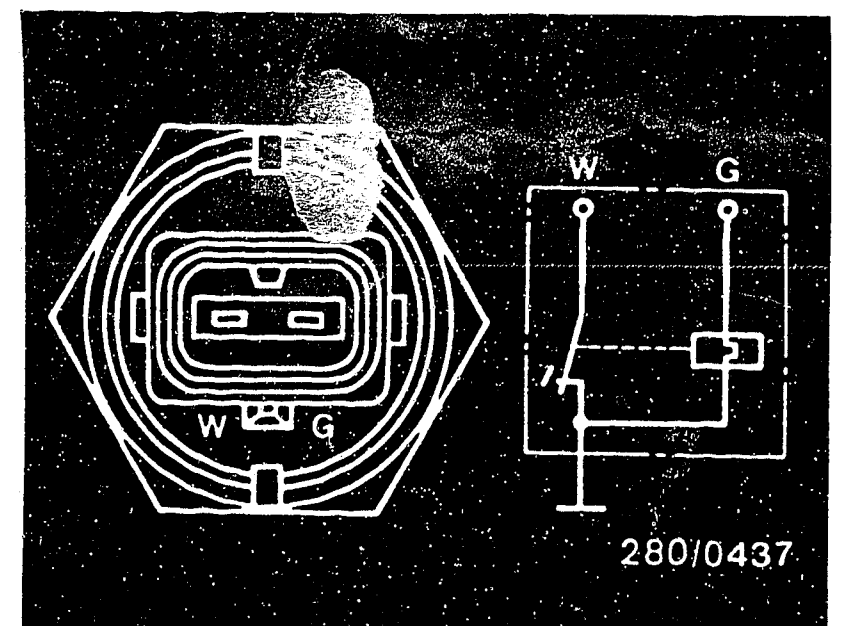
Yes

Continued on E18/E19



Thermo-time switch
0 280 130 214 ($35^{\circ}/8$ sec.)

Thermo-time switch
0 280 130 219 ($15^{\circ}/8$ sec.)



E16

Engine fails to start
BMW 5, 6 and 7 series



E17

Engine fails to start
BMW 5, 6 and 7 series



Starting motor operates, engine fails to start or starts only with great difficulty
(Continued)

Testing the start valve for leaks:

1. When installed:

Pinch off the fuel delivery line to the start valve. If engine then runs smoothly, replace start valve.

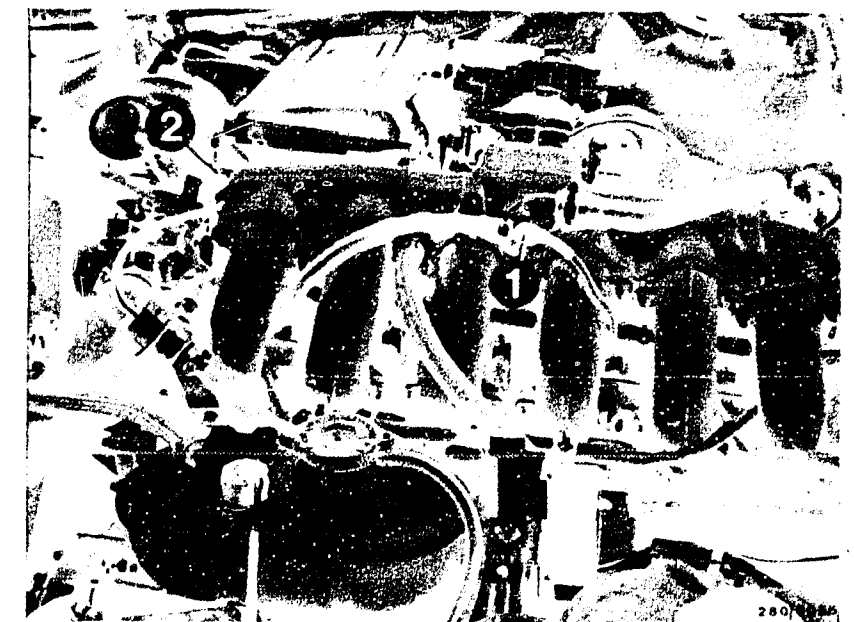
2. When removed:

Remove start valve (caution! fire hazard!). Fuel line and electric lead remain connected (place collector vessel under the start valve). Build up fuel pressure (unscrew hose between air filter and air-flow sensor. Ignition "ON" and deflect air-flow sensor flap).

Test specification: Within one minute max.

1 drop may form at the mouth of the valve.

Caution: After testing is completed, refit the hose between air filter and air-flow sensor.



1 = Start valve

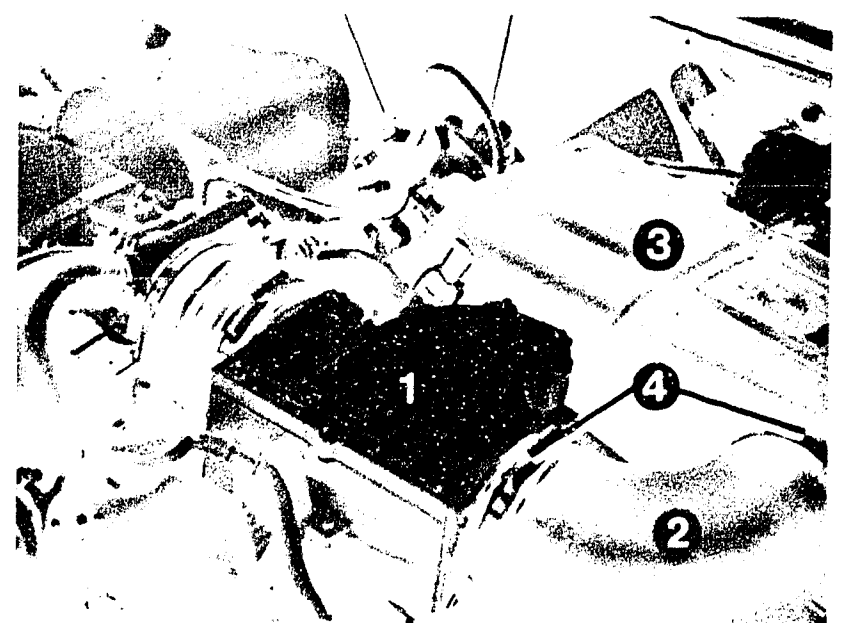
2 = Thermo-time switch

1 = Air-flow sensor

2 = Hose between air filter and air-flow sensor

3 = Air filter

4 = Fastening clamp



Post-start relay O.K.?
(Not applicable as of
8.79 model)

No

Testing: Remove plug from thermo-time switch and ground terminal "W". Pinch off fuel line to start valve. Measure battery voltage at following terminals on starting relay (start engine):

1. Measure between term. 86c (+) and term. 85: If no voltage → test leads 46 and 54 for continuity.

2. Measure between term. 86 (+) and term. 85: If no voltage → post-start relay defective.

3. Measure between term. 30 (+) and term. 85: If no voltage → test lead 50 for continuity.

4. Measure between term. 87 (+) and term. 85: If no voltage → post-start relay defective.

Yes

Continued on E20/E21

E18

Engine fails to start
BMW 5, 6 and 7 series



E19

Engine fails to start
BMW 5, 6 and 7 series



Starting motor operates, engine fails to start or starts only with great difficulty
(Continued)

Thermo-time switch
O.K.?

No

Electrical test:

Test thermo-time switch as follows:

Remove plug and make direct resistance measurement at thermo-time switch using ohmmeter.

Thermo-time switch 0 280 130 214 (35°/8 sec.):

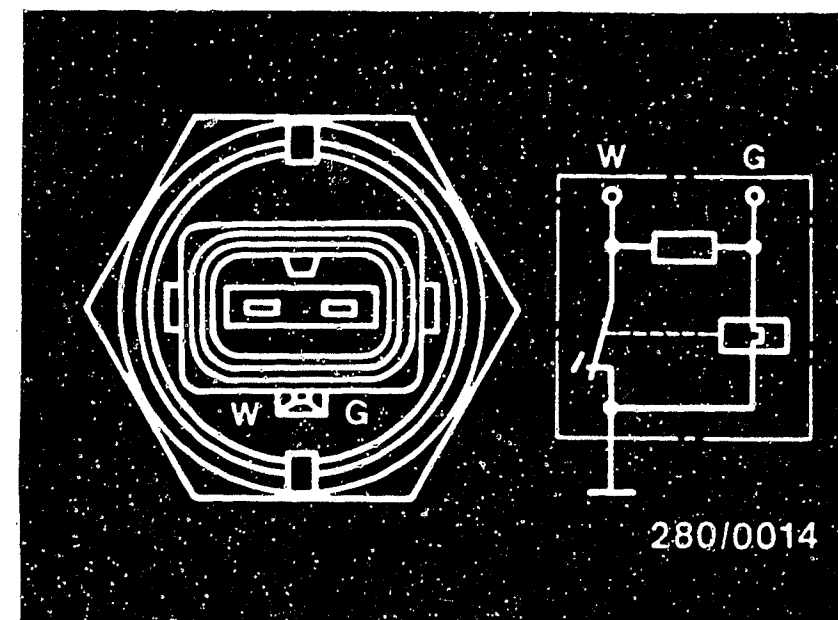
	Between term. "G" + ground	Between term. "W" + ground	Between term. "G" + "W"
Ambient temperature (below +30°C)	25...40 Ω	0 Ω	25...40 Ω
Engine at normal op. temp. (above +40°C)	50...80 Ω	100...160 Ω	50...80 Ω

Thermo-time switch 0 280 130 219 (15°/8 sec.):

	Between term "G" + ground	Between term. "W" + ground	Between term. "G" + "W"
Ambient temperature (below +10°C)	50...70 Ω	0 Ω	50...70 Ω
Ambient temperature (above +20°C)	50...70	∞ Ω	∞ Ω

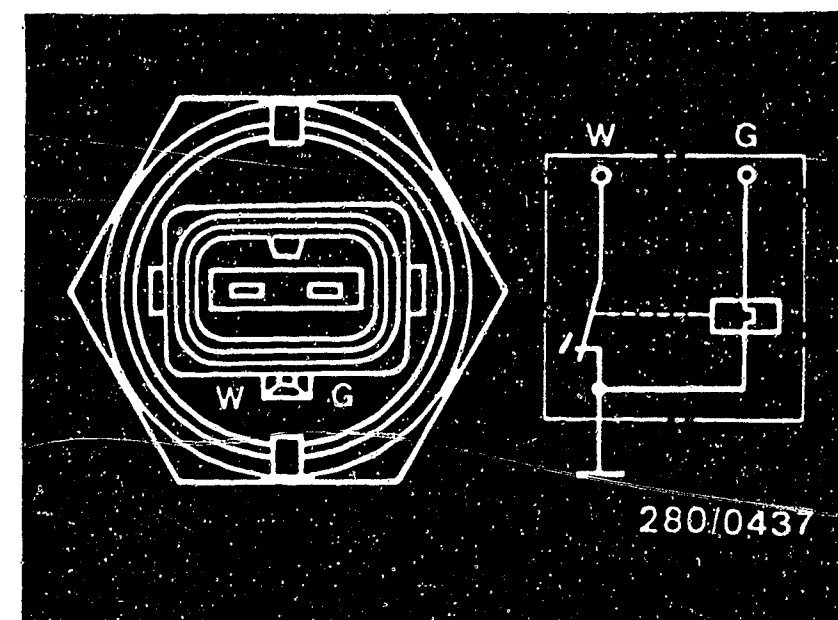
Yes

Continued on E22/E23



Thermo-time switch
0 280 130 214 (35°/8 sec.)

Thermo-time switch
0 280 130 219 (15°/8 sec.)



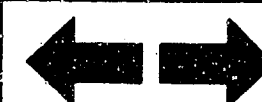
E20

Engine fails to start
BMW 5,6 and 7 series



E21

Engine fails to start
BMW 5, 6 and 7 series



Starting motor operates, engine fails to start or starts only with great difficulty
(Continued)

Auxiliary-air device
tested? (mechanically
O.K.?)

No

Testing:

1. Visual examination of auxiliary-air device.

When cold, the device must be open; when the engine is warm, it must be closed.

If not, replace auxiliary-air device.

(Remove hoses and look down, possibly using a small mirror).

2. Functional test of auxiliary-air device:

With the engine cold, pinch off hose to auxiliary-air device. Engine speed must drop. With the engine warm, pinch off hose to auxiliary-air device. Engine speed must not drop. If incorrect, replace auxiliary-air device (pay attention to direction of flow).

Only up to 7.79 model:

Before removing the auxiliary-air device, pinch off the hoses on left and right of the coolant reservoir using hose clampers (2). The auxiliary-air device is screwed into a small coolant reservoir which is mounted on the engine via a metal plate and 3 rubber-metal buffers.

Remove hoses to auxiliary-air device (1) and observe the device through the lower tail-piece. The device must be partially open when the engine is cold (either use a small mirror, or unscrew the auxiliary-air device). If replacing, pay attention to the direction of flow of auxiliary-air device.

Yes

Continued on F1/F2



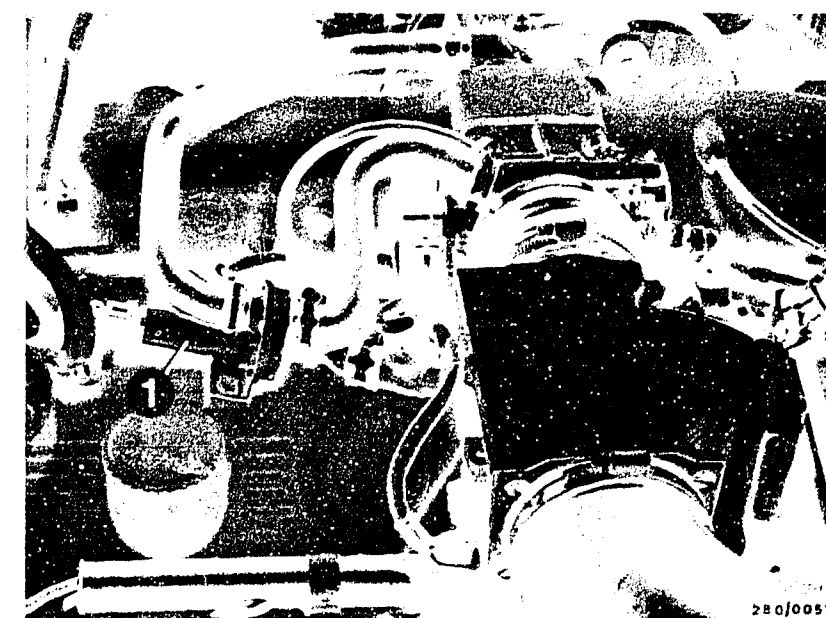
Up to 7.79 model

1 = Auxiliary-air device

2 = Hose clammer

As of 8.79 model

1 = Auxiliary-air device



E22

Engine fails to start
BMW 5, 6 and 7 series



E23

Engine fails to start
BMW 5, 6 and 7 series



Starting motor operates, engine fails to start or starts only with great difficulty
(Continued)

Temperature sensors
tested?

No

Testing:
Temperature sensor I measures the intake
air temperature and is located in the air
duct of the air-flow sensor. Measure the
following values between term. 27 and
term. 6 of air-flow sensor:

At ambient temperature
(approx. +15°...+30°C): 1.45...3.3 kΩ

Make direct resistance measurement at tem-
perature sensor II (engine) using ohmmeter.
Resistance measurement at term. 13 and
term. 49 (ground):

At ambient temperature
(approx. +15°...+30°C): 1.3...3.6 kΩ

With engine at normal operating temperature
(approx. +80°C): 250...390 Ω

If incorrect, check for open circuit or
short circuit in following leads using
ohmmeter:

Temperature sensor I:

From multiple plug term. 27 to air-flow
sensor term. 27 and from air-flow sensor
term. 6 to multiple plug term. 6.

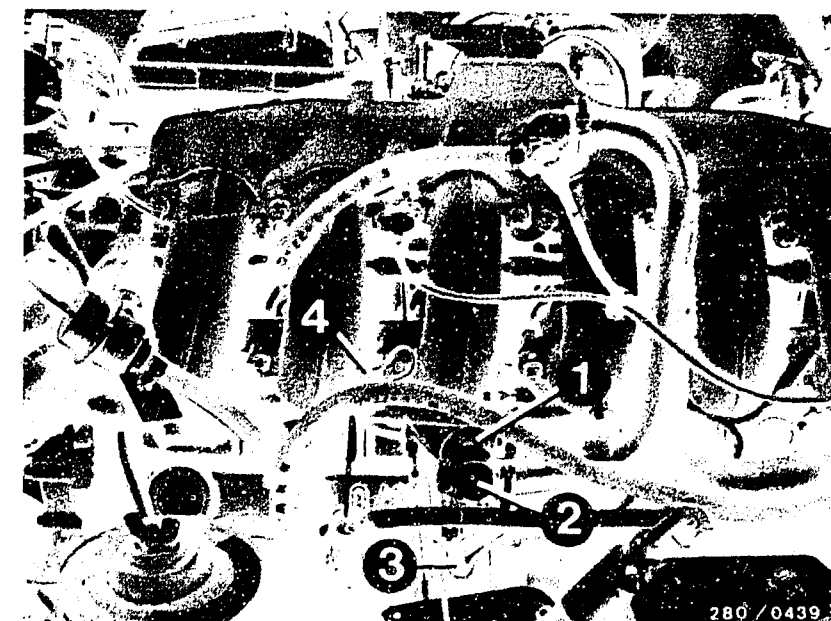
Temperature sensor II:

From multiple plug term. 13 to temperature
sensor II term. 13 and from temperature sensor
term. 49 to central ground (lead 49).

Check all contacts in the plug-in connections.

Yes

Continued on F3/F4

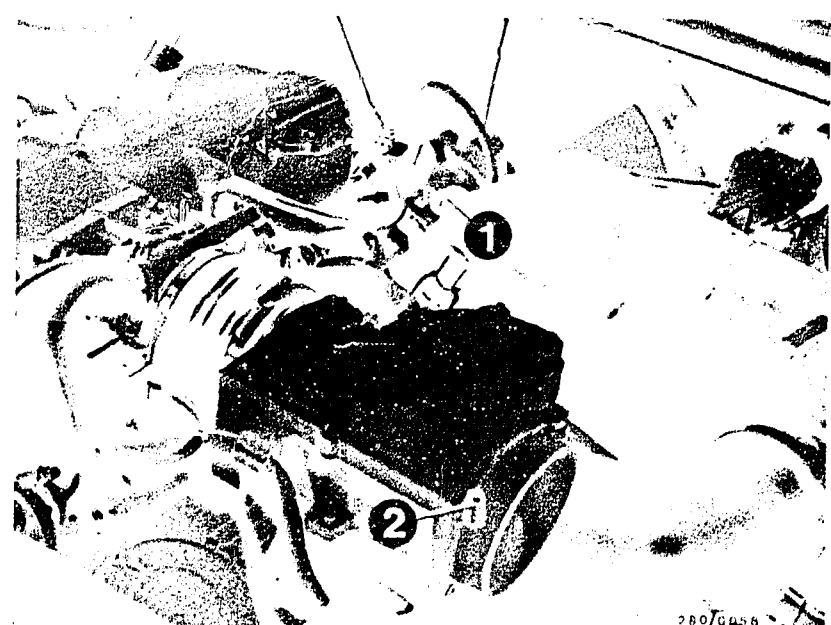


Up to 7.79 model

- 1 = Temperature sensor
- 2 = Auxiliary-air device
- 3 = Thermo-time switch
- 4 = Ground lead from auxiliary-
air device to ram pipe

As of 8.79 model

- 1 = Temperature sensor II
- 2 = Temperature sensor I in
air-flow sensor (intake
duct)



F1

Engine fails to start
BMW 5, 6 and 7 series



F2

Engine fails to start
BMW 5, 6 and 7 series



Starting motor operates, engine fails to start or starts only with great difficulty
(Continued)

Air-flow sensor O.K.?

No

Testing:

Unscrew hose between air filter and air-flow sensor. Open air-flow sensor flap by hand. It must be possible to open the air-flow sensor flap with uniform ease from its fully closed position to its fully open position. When released, the flap must close completely by itself. When the air-flow sensor flap is opened it must not catch at any point. Watch for any indications of abrasion or rubbing. Clean air-flow sensor if the inside is very dirty and rub out with a lint-free cloth. If there are any signs of abrasion or rubbing, replace the air-flow sensor. Connect ohmmeter to term. 7 and term. 8 of air-flow sensor. Deflect sensor flap.

Measure resistance.

Test specification:

100...500 Ω

as of FD 049:

200...1000 Ω

Caution!

After testing is completed, refit the hose between air filter and air-flow sensor.

Yes

Engine missing due to interference?
Engine running O.K.?

No

Test internal resistance of spark-plug connectors and distributor connectors as well as of H.T. ignition cables.

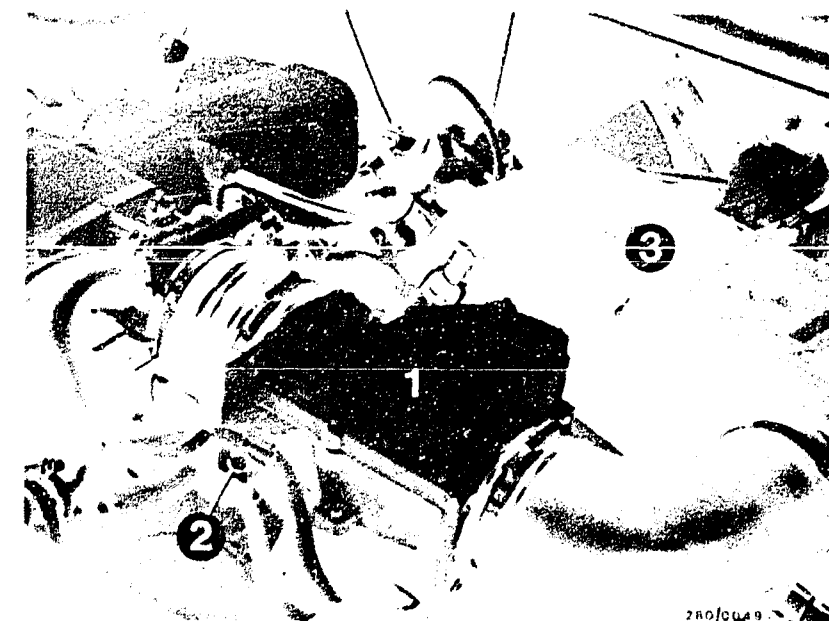
Interference-suppression resistor value of spark-plug connectors:

1.12 k Ω ...1.68 k Ω

If interference-suppression resistors are found to have a value less than 500 Ω , they must be replaced.

Yes

Continued on F5/F6



1 = Air-flow sensor

F3

Engine fails to start
BMW 5, 6 and 7 series



F4

Engine fails to start
BMW 5, 6 and 7 series



Starting motor operates, engine fails to start or starts only with great difficulty
(Continued)

Are all hose lines and electric leads securely connected?
Visual examination. Is the air-intake system leak-tight?

No

Check whether hoses of intake-air system and of fuel line system are correctly attached, not kinked or damaged. If necessary, replace hoses. Eliminate leaks by using new seals or by retightening the connecting screws.
Checking for leaks: Seal off the exhaust tail pipe. Screw off hose from air filter to air-flow sensor on air-flow sensor and seal off air-flow sensor duct. Pull off hose after auxiliary-air device and blow air (0.3 bar) into the intake manifold with a compressed-air gun. Seal off the connection port on the auxiliary-air device. Open the throttle valve fully. Brush or spray all joints with soapy water. Bubbling or foaming indicates a leak. Check electric contacts for loose contacts.

Yes

Testing completed for customer complaint

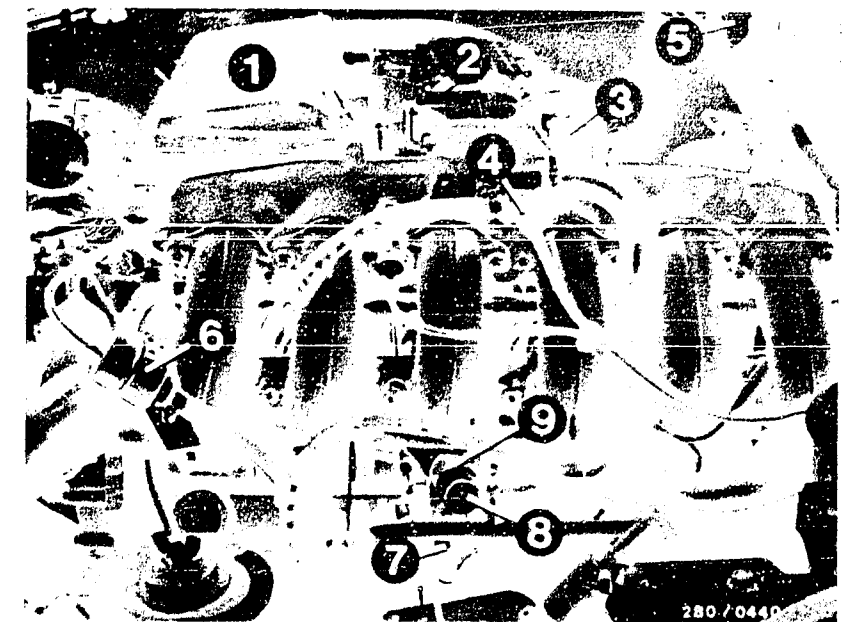
"Starting motor operates, engine fails to start"

Customer complaint remedied?

No

Further possibilities:

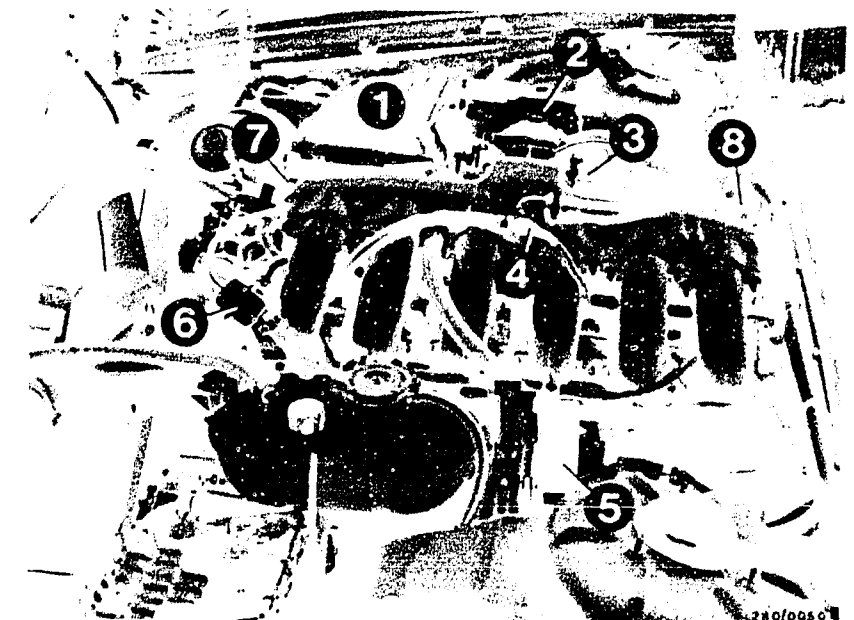
- Customer complaint incorrectly diagnosed (see Coordinates B3...B8). If the fault has not been detected by "direct trouble-shooting", see "detailed trouble-shooting" (Coordinate B3/B4).
- Engine not mechanically O.K. (Compression, valve setting, valve timing, worn camshaft).



Up to 7.1979 model

- 1 = Air filter
- 2 = Air-flow sensor
- 3 = Throttle-valve switch
- 4 = Start valve
- 5 = Relay set
- 6 = Pressure regulator
- 7 = Thermo-time switch
- 8 = Auxiliary-air device
- 9 = Temperature sensor II (engine)

As of 8.1979 model



F5

Engine fails to start
BMW 5, 6 and 7 series



F6

Engine fails to start
BMW 5, 6, and 7 series



Trouble-shooting program according to customer complaints

How to use the following trouble-shooting program

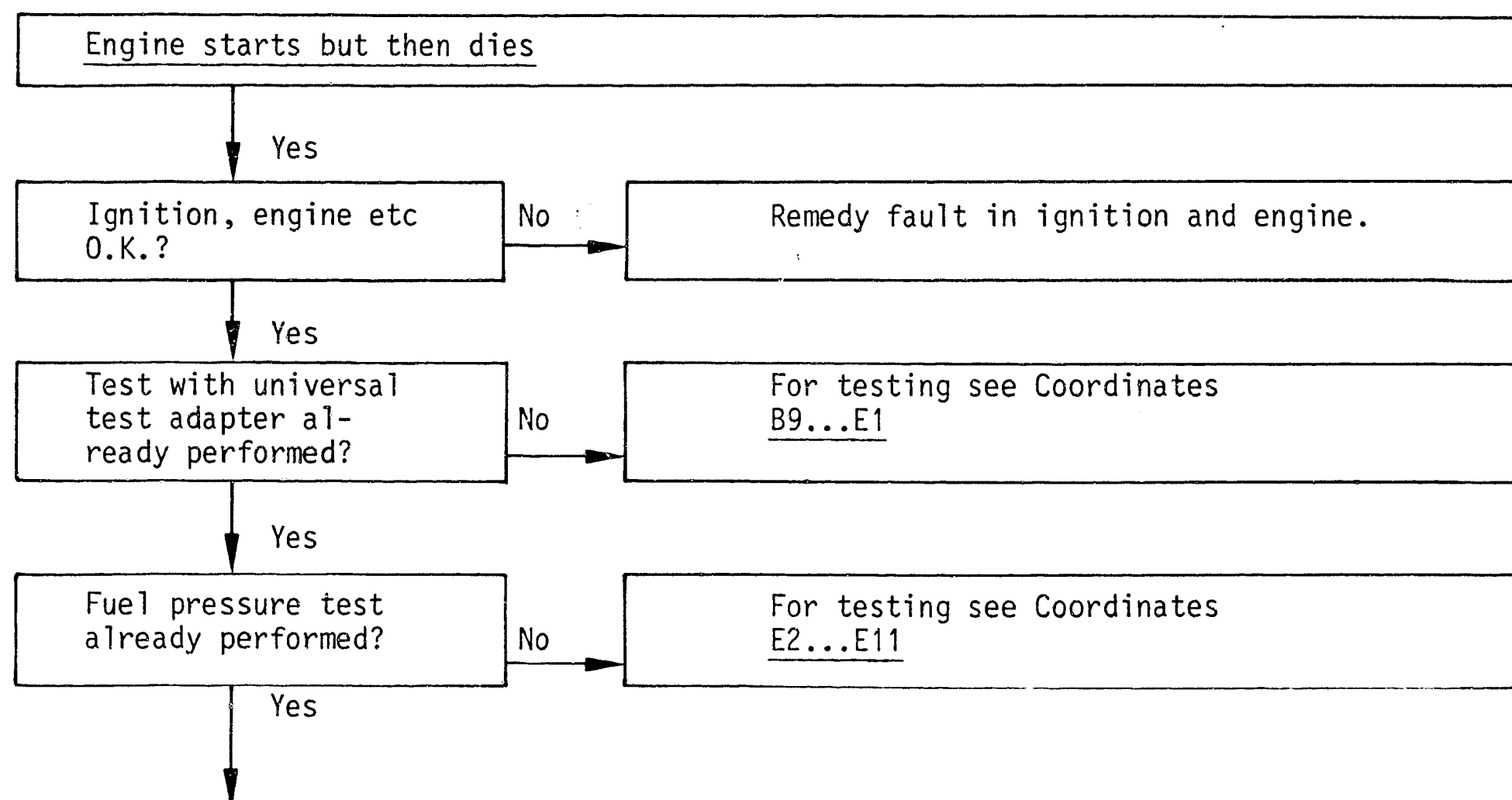
The program is divided into three rows of boxes:

1. The left-hand row contains the questions on the tests.
2. The middle row contains descriptions of the testing and adjustment operations on the components.
3. The right-hand row contains the illustrations belonging to the text and explains the illustrations.

If the questions can be answered conclusively with "yes" without testing, proceed to the next question below.

If, on the other hand, the answer to the question is "no", and you suspect a fault, branch to the middle row of boxes and carry out the tests given there.

When you have finished testing continue trouble-shooting at the point at which you branched off.



Continued on F9/F10

F7

Engine starts but then dies
BMW 5, 6 and 7 series



F8

Engine starts but then dies
BMW 5, 6 and 7 series



Engine starts but then dies (Continued)

Start valve O.K.?
(Leak test)

No

Testing the start valve for leaks:

1. When installed:

Pinch off the fuel delivery line to the start valve. If engine then runs smoothly, replace start valve.

2. When removed:

Remove start valve (caution! fire hazard!). Fuel line and electric lead remain connected (place collector vessel under the start valve). Build up fuel pressure (unscrew hose between air filter and air-flow sensor. Ignition "ON" and deflect air-flow sensor flap).

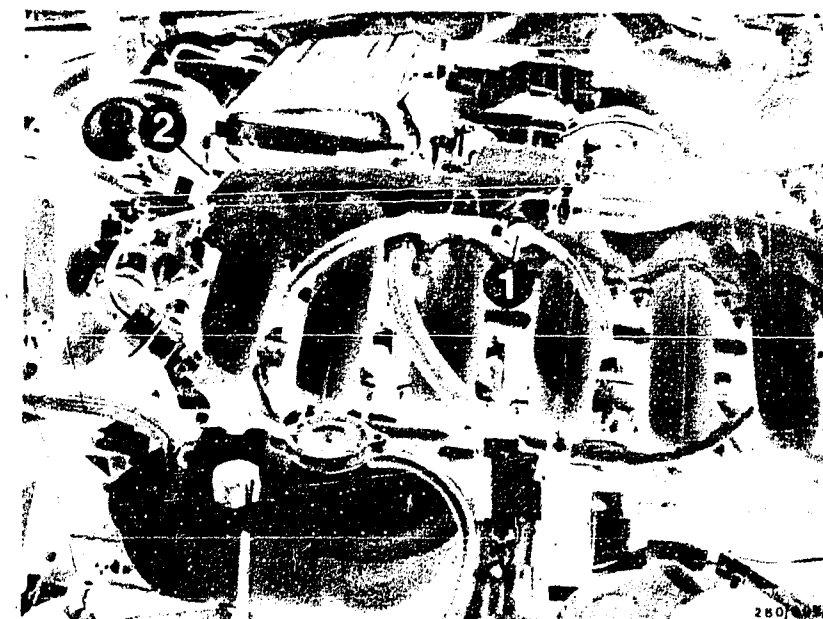
Test specification: Within one minute max: 1 drop may form at the mouth of the valve.

Caution!

After testing is completed, refit the hose between air filter and air-flow sensor. Check connection for leaks and check ground connection (ground lead) on air-flow sensor.

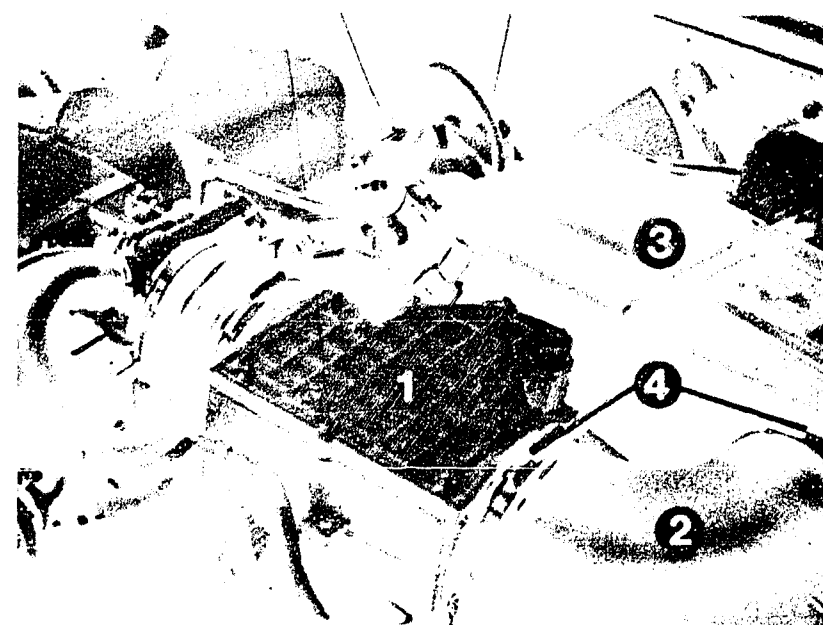
Yes

Continued on F11/F12



- 1 = Start valve
- 2 = Thermo-time switch

- 1 = Air-flow sensor
- 2 = Hose between air filter and air-flow sensor
- 3 = Air filter
- 4 = Fastening clamps



F9

Engine starts but then dies
BMW 5, 6 and 7 series



F10

Engine starts but then dies
BMW 5, 6 and 7 series



Engine starts but then dies (Continued)

Auxiliary-air device tested? (Mechanically O.K.?)

No

Testing:

1. Visual examination of auxiliary-air device.

When cold, the device must be open; when the engine is warm, it must be closed. If not, replace auxiliary-air device. (Remove hoses and look down, possibly using a small mirror).

2. Functional test of auxiliary-air device:

With the engine cold, pinch off hose to auxiliary-air device. Engine speed must drop. With the engine warm, pinch off hose to auxiliary-air device. Engine speed must not drop. If incorrect, replace auxiliary-air device (pay attention to direction of flow).

Only up to 7.79 model:

Before removing the auxiliary-air device, pinch off the hoses on the left and right of the coolant reservoir using hose clampers (2). The auxiliary-air device is screwed into a small coolant reservoir which is mounted on the engine via a metal plate and 3 rubber-metal buffers.

Remove hoses to auxiliary-air device (1) and observe the device through the lower tail-piece. The device must be partially open when the engine is cold (either use a small mirror, or unscrew the auxiliary-air device). If replacing, pay attention to the direction of flow of auxiliary-air device.

Yes

Continued on F13/F14



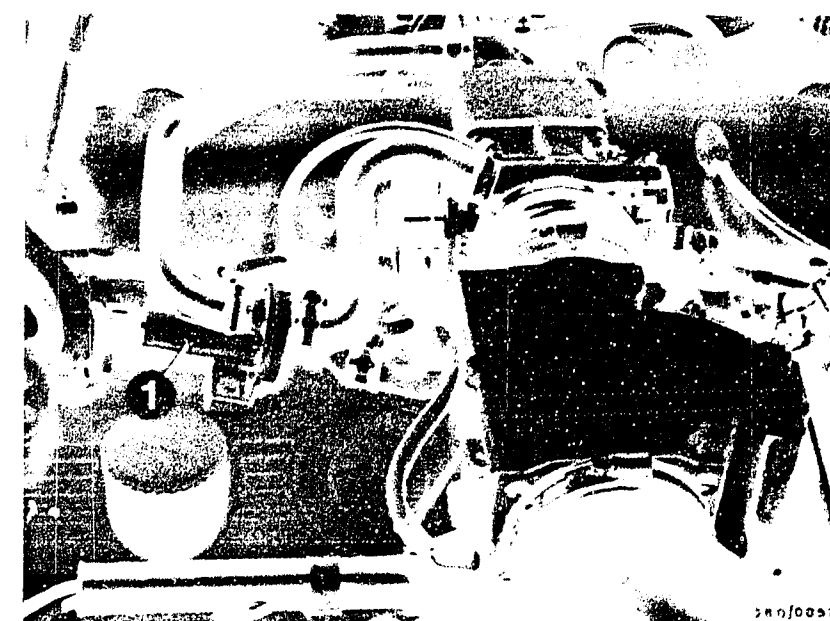
Up to 7.79 model

1 = Auxiliary-air device

2 = Hose clammer

As of 8.79 model

1 = Auxiliary-air device



F11

Engine starts but then dies

BMW 5, 6 and 7 series



F12

Engine starts but then dies

BMW 5, 6 and 7 series



Engine starts but then dies (Continued)

Temperature sensors tested?

No

Testing:

Temperature sensor I measures the intake air temperature and is located in the air duct of the air-flow sensor. Measure the following values between term. 27 and term. 6 of air-flow sensor.

At ambient temperature (approx. +15°...+30°C): 1.45...3.3 kΩ

Make direct resistance measurement at temperature sensor II (engine) using ohmmeter. Resistance measurement at term. 13 and term. 49 (ground):

1. At ambient temperature (approx. +15°...+30°C): 1.30...3.6 kΩ
2. With engine at normal operating temperature (approx. +80°C): 250...390 Ω

If incorrect, check for open circuit or short circuit in following leads using ohmmeter:

Temperature sensor I:

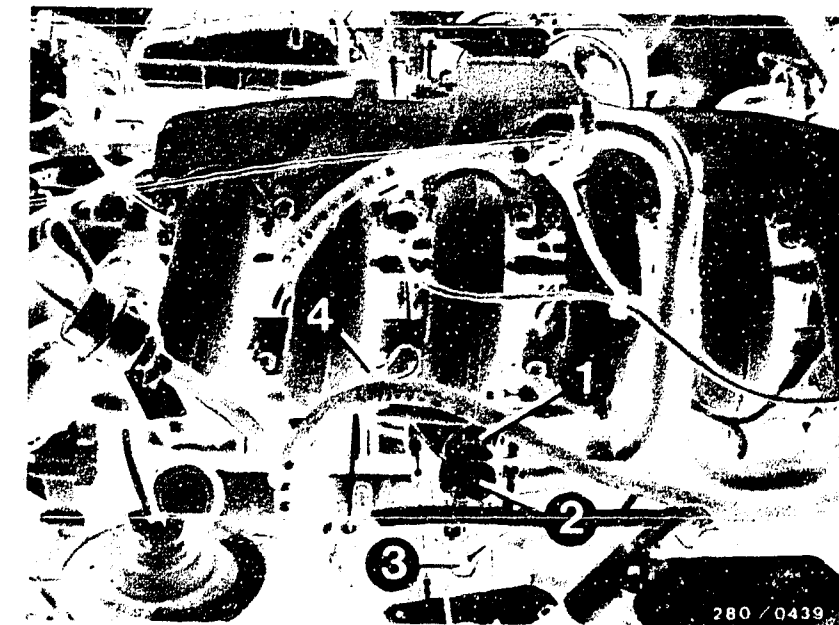
From multiple plug term. 27 to air-flow sensor term. 27 and from air-flow sensor term. 6 to multiple plug term. 6

Temperature sensor II:

From multiple plug term. 13 to temperature sensor II term. 13 from temperature sensor II term. 49 to central ground (lead 49).

Check all contacts in the plug-in connections.

Yes

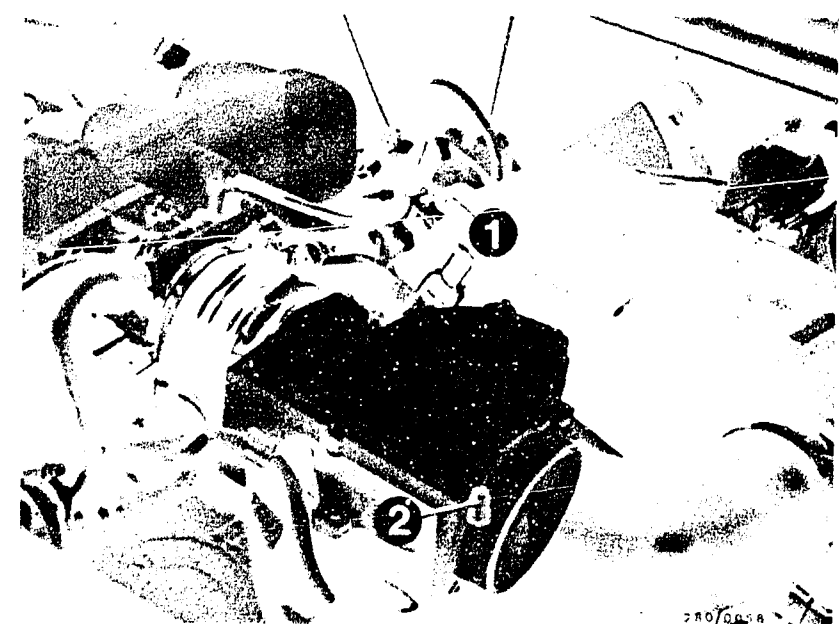


Up to 7.79 model

- 1 = Temperature sensor
- 2 = Auxiliary-air device
- 3 = Thermo-time switch
- 4 = Ground lead from auxiliary-air device to ram pipe

As of 8.79 model

- 1 = Temperature sensor II
- 2 = Temperature sensor I in air-flow sensor (intake duct)



Continued on F15/F16

F13

Engine starts but then dies
BMW 5, 6 and 7 series



F14

Engine starts but then dies
BMW 5, 6 and 7 series



Engine starts but then dies (Continued)

Air-flow sensor
O.K.?

No

Testing:

Unscrew hose between air filter and air-flow sensor. Open air-flow sensor flap by hand. It must be possible to open the air-flow sensor flap with uniform ease from its fully closed position to its fully open position. When released, the flap must close completely by itself. When the air-flow sensor flap is opened it must not catch at any point. Watch for any indications of abrasion or rubbing. Clean air-flow sensor if the inside is very dirty and rub out with a lint-free cloth. If there are any signs of abrasion or rubbing, replace the air-flow sensor. Connect ohmmeter to term. 7 and term. 8 of air-flow sensor. Measure resistance. Deflect air-flow sensor flap.

Test specification:

100...500 Ω

as of FD 049:

200...1000 Ω

Checking the pump contact:

Remove plug from air-flow sensor. Measure resistance between term. 36 and term. 39 using ohmmeter.

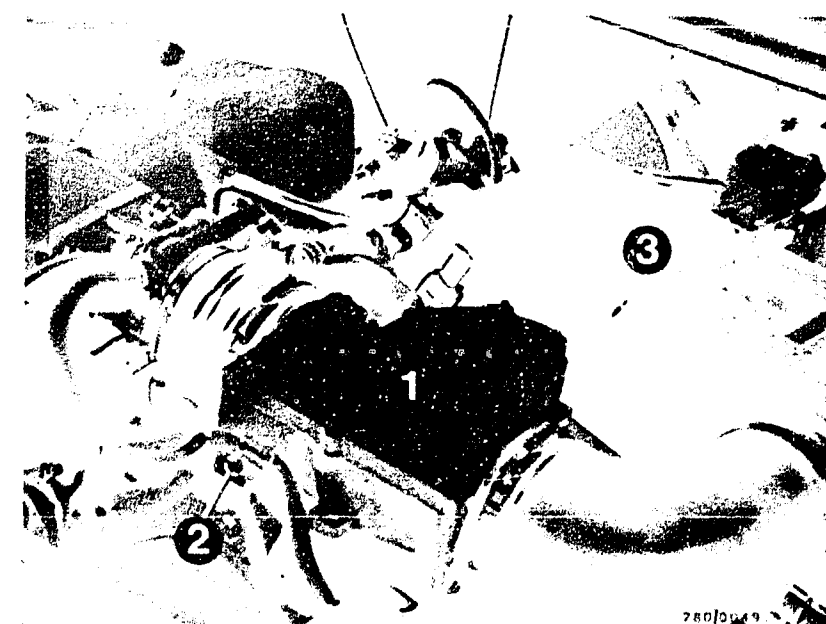
Deflect air-flow sensor flap. Set value approx. 0 Ω .

Caution:

After testing is completed, refit the hose between air filter and air-flow sensor.

Yes

Continued on F17/F18



1 = Air-flow sensor

F15

Engine starts but then dies
BMW 5, 6 and 7 series



F16

Engine starts but then dies
BMW 5, 6 and 7 series



Engine starts but then dies (Continued)

Are all hose lines and electric leads securely connected?
Visual examination. Is the air-intake system leak-tight?

No

Check whether hoses of intake-air system and of fuel line system are correctly attached, not kinked or damaged. If necessary, replace hoses. Eliminate leaks by using new seals or by retightening the connecting screws.
Checking for leaks: Seal off the exhaust tail pipe. Screw off hose from air filter to air-flow sensor on air-flow sensor and seal off air-flow sensor duct. Pull off hose after auxiliary-air device and blow air (0.3 bar) into the intake manifold with a compressed-air gun. Seal off the connection port on the auxiliary-air device. Open the throttle valve fully. Brush or spray all joints with soapy water. Bubbling or foaming indicates a leak. Check electric contacts for loose contacts.

Yes

Testing completed for customer complaint

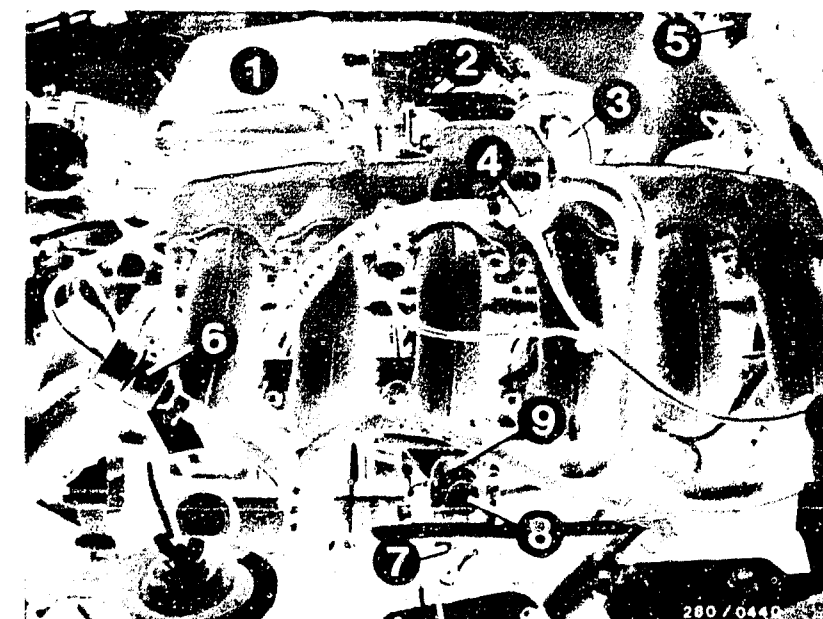
"Engine starts but then dies"

Customer complaint remedied?

No

Further possibilities:

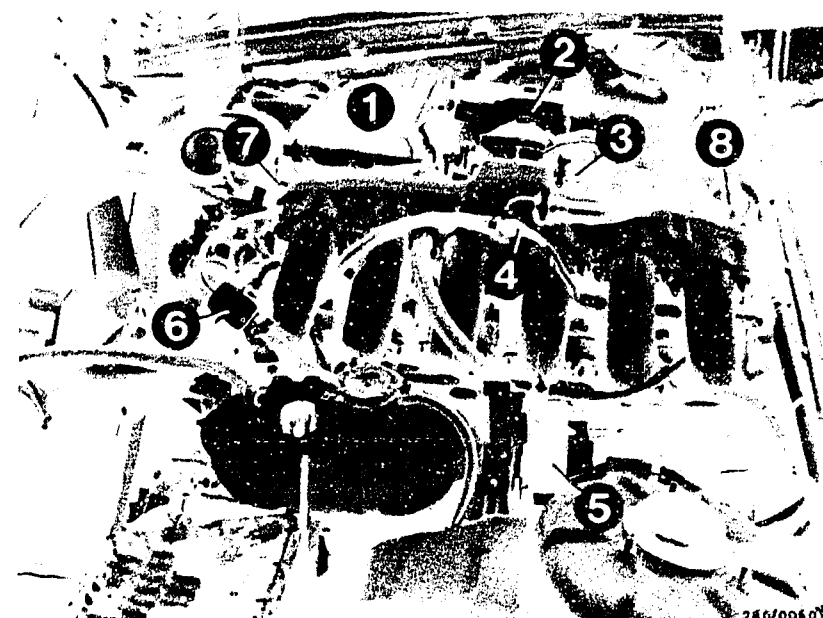
- Customer complaint incorrectly diagnosed (see Coordinates B3...B8). If the fault has not been detected by "direct trouble-shooting", see "detailed trouble-shooting" (Coordinate B3/B4).
- Engine not mechanically O.K. (Compression, valve setting, valve timing, worn camshaft).



Up to 7.1979 model

- 1 = Air filter
- 2 = Air-flow sensor
- 3 = Throttle-valve switch
- 4 = Start valve
- 5 = Relay set
- 6 = Pressure regulator
- 7 = Thermo-time switch
- 8 = Auxiliary-air device
- 9 = Temperature sensor II (engine)

As of 8.1979 model



F17

Engine starts but then dies
BMW 5, 6 and 7 series



F18

Engine starts but then dies
BMW 5, 6 and 7 series



Trouble-shooting program according to customer complaints

How to use the following trouble-shooting program

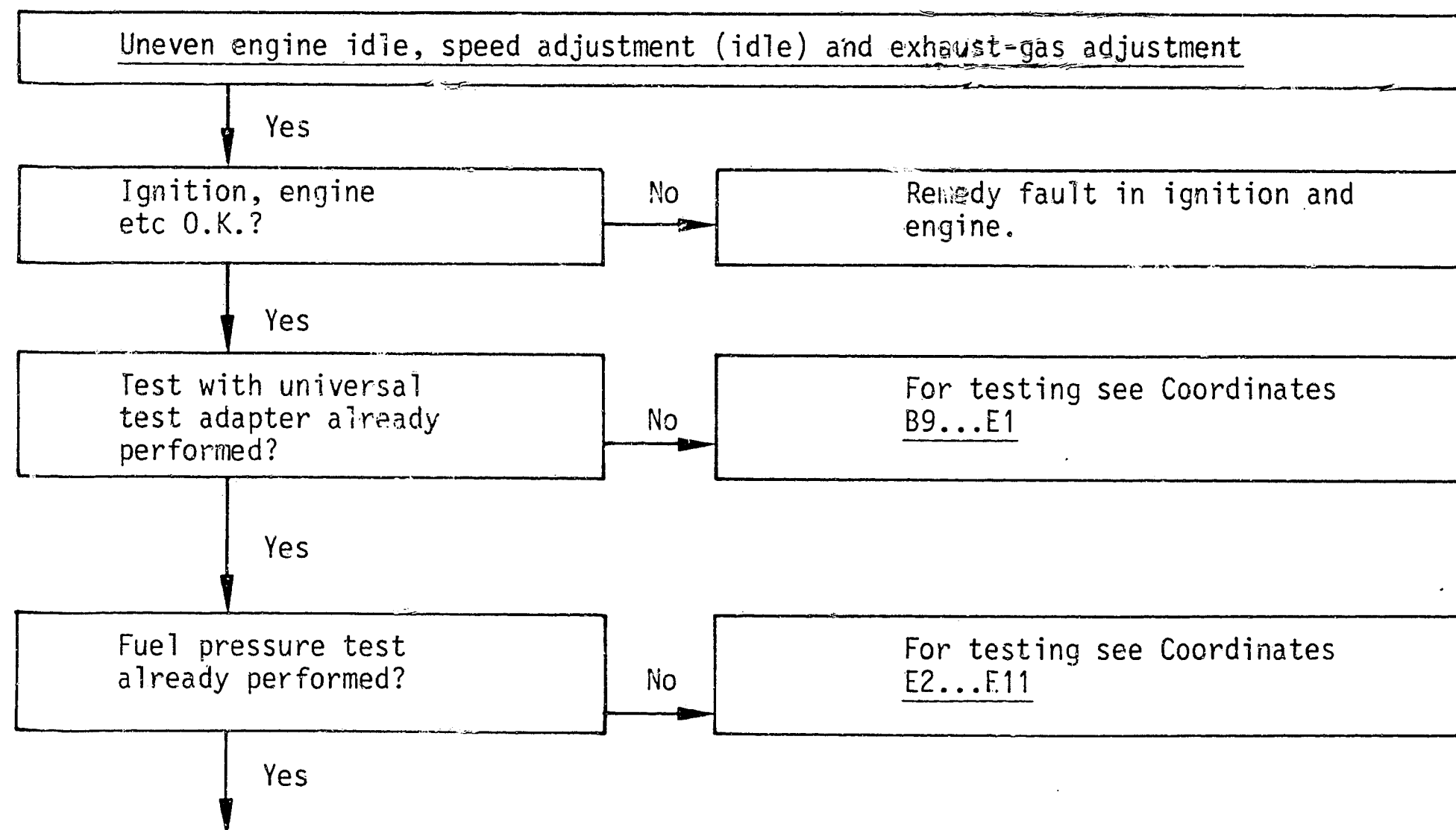
The program is divided into three rows of boxes:

1. The left-hand row contains the questions on the tests.
2. The middle row contains descriptions of the testing and adjustment operations on the components.
3. The right-hand row contains the illustrations belonging to the text and explains the illustrations.

If the questions can be answered conclusively with "yes" without testing, proceed to the next question below.

If, on the other hand, the answer to the question is "no", and you suspect a fault, branch to the middle row of boxes and carry out the tests given there.

When you have finished testing continue trouble-shooting at the point at which you branched off.



Continued on G3/G4

G1

Uneven engine idle
BMW 5, 6 and 7 series



G2

Uneven engine idle
BMW 5, 6 and 7 series



Uneven engine idle, speed adjustment (idle) and exhaust-gas adjustment

(Continued)

Throttle valve closed?

No

Yes

Testing:

Throttle valve closed?

Check whether the throttle valve can be closed still further and whether the engine speed thereby drops.

Set the throttle valve to a hair's breadth gap.

Caution: Throttle valve must not stick.

Setting the throttle-valve switch:

As of 8.79 model

Loosen fastening screws slightly. Connect ohmmeter to term. 2 and term. 18. Turn throttle-valve switch to the right until the idle contact closes (reading 0Ω).

Checking the setting:

Pull slightly on the throttle cable. The idle contact must close (reading $\infty \Omega$).

Up to 7.79 model

Connect ohmmeter to term. 2 and term. 18.

Loosen fastening screws (1) slightly.

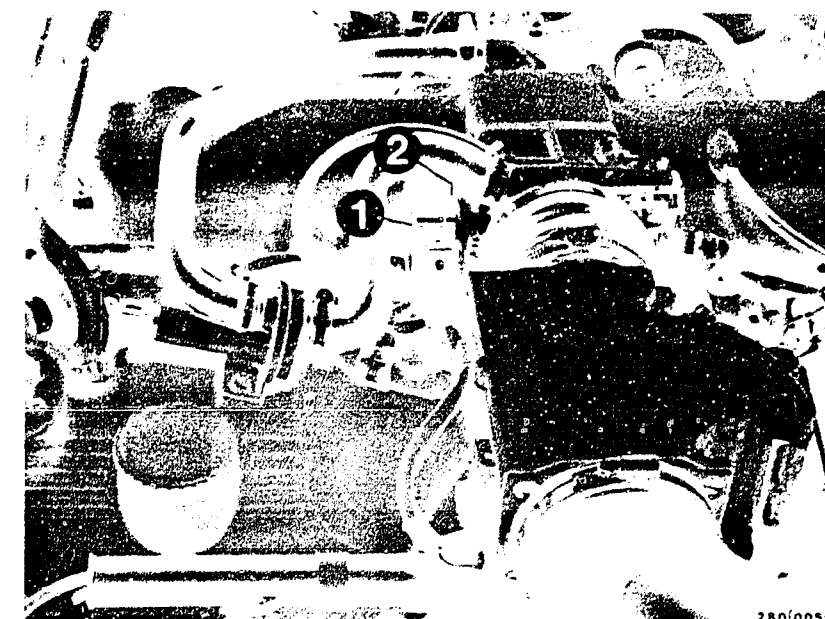
Open the throttle valve until the stop bracket (2) is approx. 3 mm from the stop screw (3). Starting from the open idle contact (reading $\infty \Omega$), turn the throttle-valve switch until the idle contact closes (reading 0Ω).

Trouble-shooting:

Test the following leads for continuity with ohmmeter (set value approx. 0Ω):

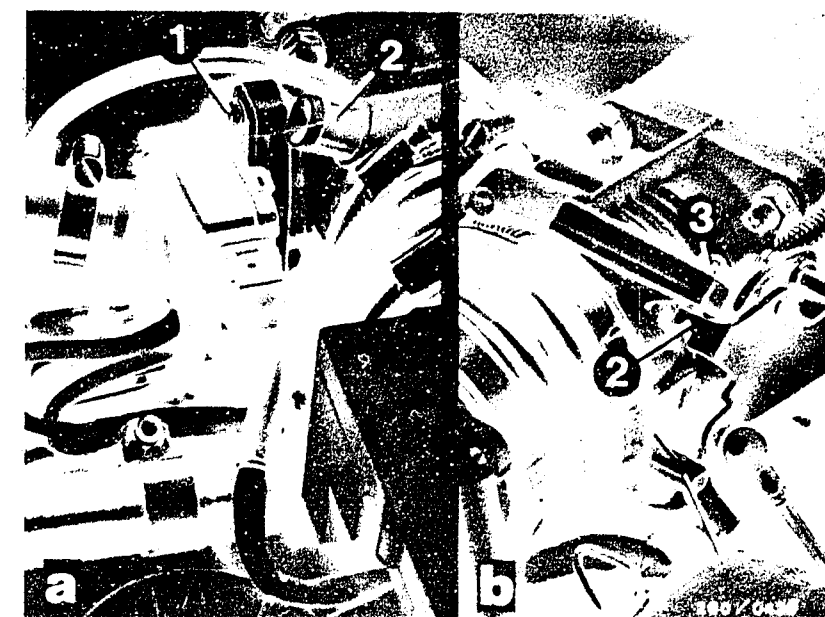
From multiple plug term. 2 to throttle-valve switch term. 2, from throttle-valve switch term. 18 to multiple plug term. 18.

Eliminate contact resistances in the plug-in connections.



- 1 = Throttle-valve switch
- 2 = Fastening screws

- 1 = Fastening screws
- 2 = Stop bracket
- 3 = Stop screw



Continued on G5/G6

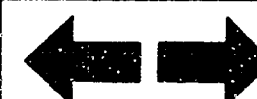
G3

Uneven engine idle
BMW 5, 6 and 7 series



G4

Uneven engine idle
BMW 5, 6 and 7 series



Uneven engine idle, speed adjustment (idle) and exhaust-gas adjustment

(Continued)

CO and idle speed
correctly adjusted?

No

CO and idle adjustment

Exhaust-gas test with CO analyzer with engine
at normal operating temperature and at idle
speed.

Idle speed

Manually-shifted transmission and automatic
transmission (selector lever in
position P): $850 \dots 950 \text{ min}^{-1}$

CO setting

Test specification: $0.5 \dots 2.0 \text{ \% by vol. CO}$

Sweden version with secondary air:

$0.3 \dots 0.5 \text{ \% by vol. CO}$

If CO concentration too high, turn bypass screw
(CO adjusting screw) in air-flow sensor half a
turn in a counterclockwise direction. Check
idle speed and CO concentration again. Carry
out adjustments in several steps. After ad-
justing, use new plugs.

Yes

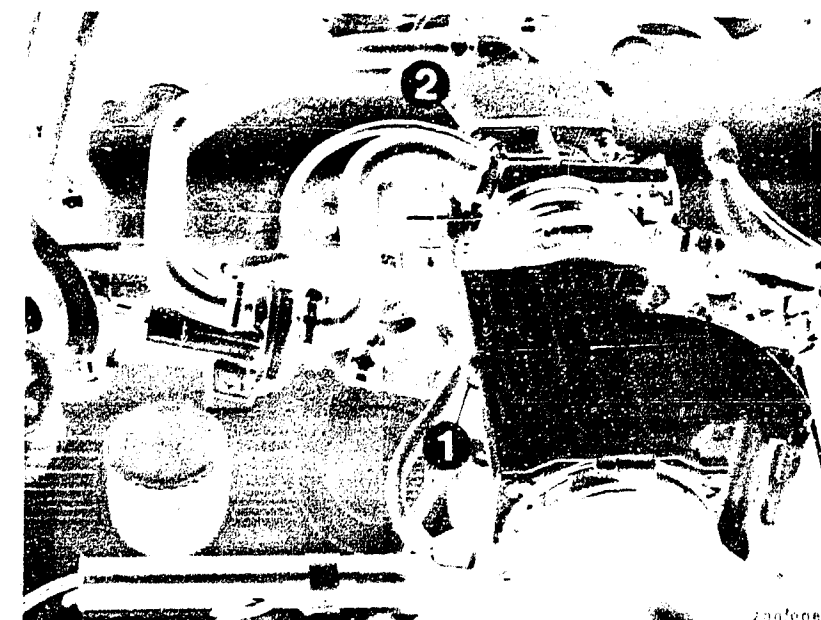
Can engine speed not
be adjusted?

Yes

Leak test performed at valve
corner, engine-oil filler neck
and oil dipstick?

Yes

Continued on G7/G8



1 = CO adjusting screw

2 = Idle-speed-adjusting screw

G5

Uneven engine idle

BMW 5, 6 and 7 series



G6

Uneven engine idle

BMW 5, 6 and 7 series



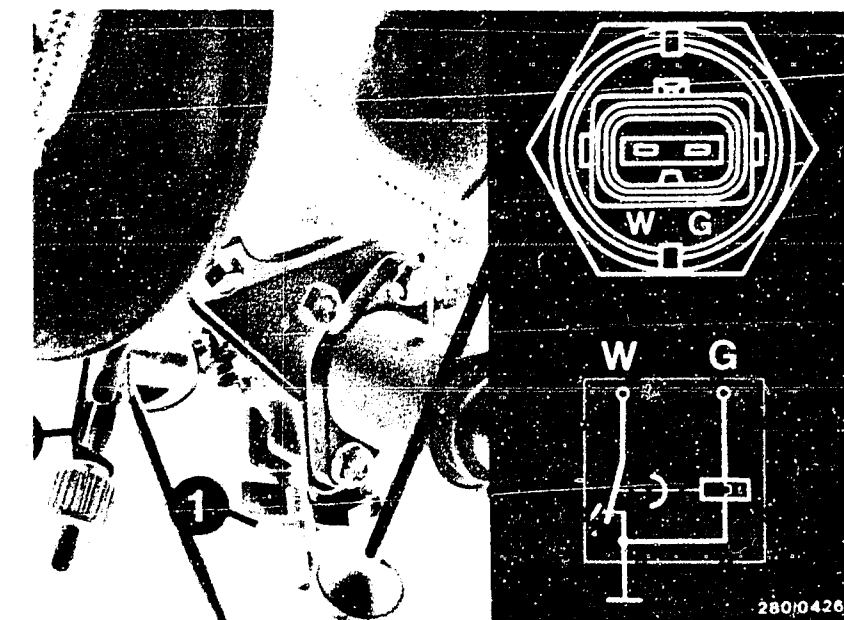
Uneven engine idle, speed adjustment (idle) and exhaust-gas adjustment (Continued)

Thermo-time switch O.K.?

No

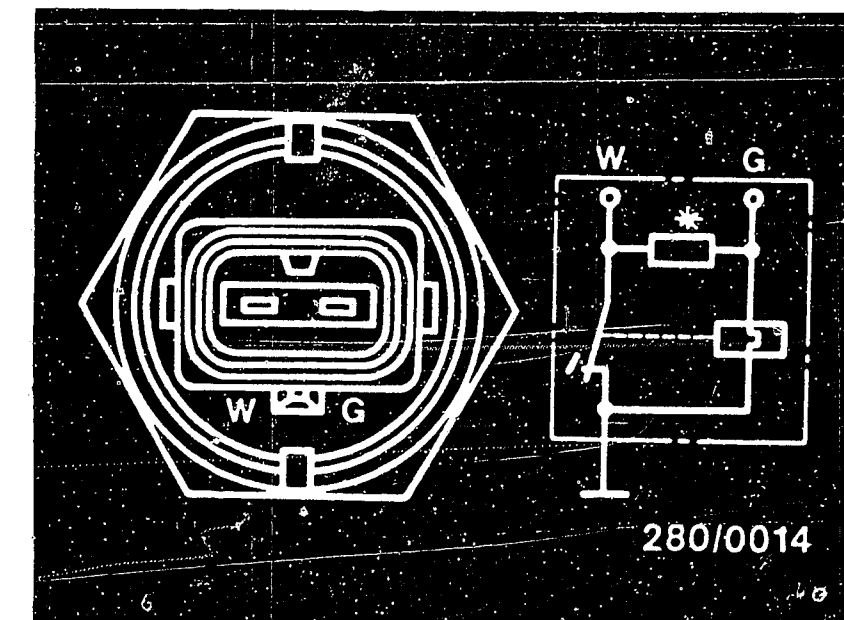
Electrical test:			
Test thermo-time switch as follows:			
Remove plug and make direct resistance measurement at thermo-time switch using ohmmeter.			
Thermo-time switch 0 280 130 214 (35°/8 sec.):			
	Between term. "G" + ground	Between term. "W" + ground	Between term. "G" + "W"
Ambient temperature (below +30°C)	25...40 Ω	0 Ω	25...40 Ω
Engine at normal op. temp. (above +80°C)	50...80 Ω	100...160 Ω	50...80 Ω
Thermo-time switch 0 280 130 219 (15°/8 sec.):			
	Between term. "G" + ground	Between term. "W" + ground	Between term. "G" + "W"
Ambient temperature (below +10°C)	50...70 Ω	0 Ω	50...70 Ω
Engine at operating temperature (above +40°C)	50...70 Ω	∞ Ω	∞ Ω

Yes



1 = Thermo-time switch

*Not on 0 280 130 219



Continued on G9/G10

Uneven engine idle, speed adjustment (idle) and exhaust-gas adjustment
(Continued)

Start valve O.K.?

No

Testing the start valve for leaks:

1. When installed:

Pinch off the fuel delivery line to the start valve. If engine then runs smoothly, replace start valve.

2. When removed:

Remove start valve (caution! fire hazard!).

Fuel line and electric lead remain connected (place collector vessel under the start valve). Build up fuel pressure (unscrew hose between air filter and air-flow sensor. Ignition "ON" and deflect air-flow sensor flap).

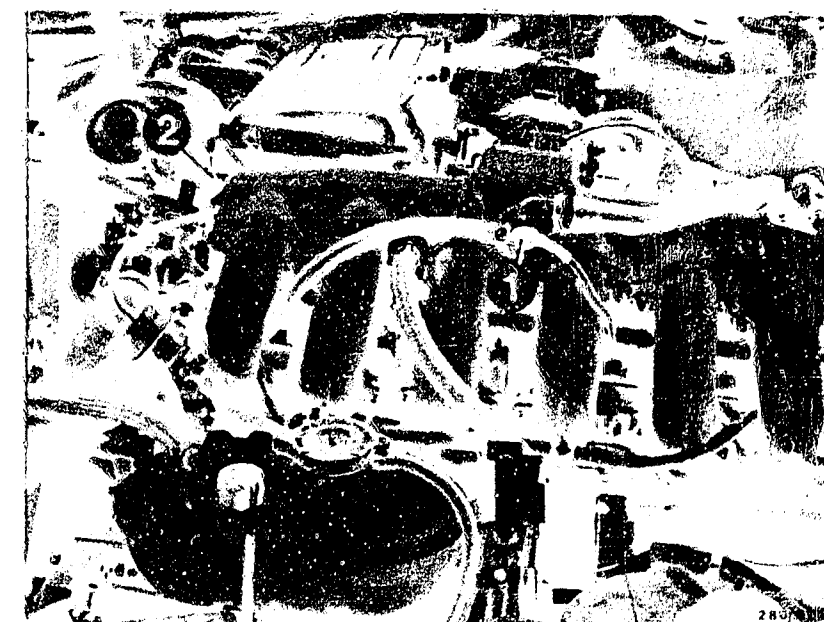
Test specification: Within one minute max. 1 drop may form at the mouth of the valve.

Caution!

After testing is completed, refit the hose between air filter and air-flow sensor.

Yes

Continued on G11/G12



1 = Start valve
2 = Thermo-time switch
(brown plug)

G9

Uneven engine idle
BMW 5, 6 and 7 series



G10

Uneven engine idle
BMW 5, 6 and 7 series



Uneven engine idle, speed adjustment (idle) and exhaust-gas adjustment

(Continued)

Auxiliary-air device
tested (mechanically O.K.?)

No

Testing:

1. Visual examination of auxiliary-air device.

When cold, the device must be open, when the engine is warm, it must be closed. If not, replace auxiliary-air device. (Remove hoses and look down, possibly using a small mirror).

2. Functional test of auxiliary-air device:

With the engine cold, pinch off hose to auxiliary-air device. Engine speed must drop. With the engine warm, pinch off hose to auxiliary-air device. Engine speed must not drop. If incorrect, replace auxiliary-air device (pay attention to direction of flow).

Only up to 7.79 model:

Before removing the auxiliary-air device, pinch off the hoses on the left and right of the coolant reservoir using hose clampers (2). The auxiliary-air device is screwed into a small coolant reservoir which is mounted on the engine via a metal plate and 3 rubber-metal buffers.

Remove hoses to auxiliary-air device (1) and observe the device through the lower tailpiece. The device must be partially open when the engine is cold (either use a small mirror, or unscrew the auxiliary-air device). If replacing, pay attention to the direction of flow of auxiliary-air device.

Yes

Continued on G13/G14

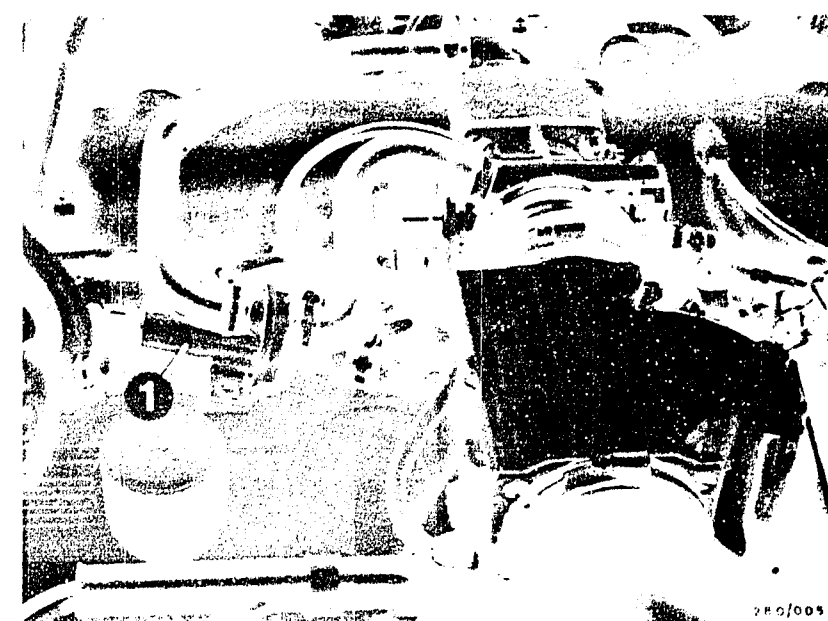


Up to 7.79 model

1 = Auxiliary-air device
2 = Hose clammer

As of 8.79 model

1 = Auxiliary-air device



G11

Uneven engine idle
BMW 5, 6 and 7 series



G12

Uneven engine idle
BMW 5, 6 and 7 series



Uneven engine idle, speed adjustment (idle) and exhaust-gas adjustment

(Continued)

Injection valve
mechanically O.K.?

No

With the engine running, disconnect the injection valve connectors individually, one after the other, from the injection valves and plug on again. Engine speed must drop if injection valve is O.K. Test for continuity in connecting leads of relay set term. 88b and term. 88e via the injection valves to control unit term. 14, 15, 30, 31, 32 and 33. If necessary, replace leads or solenoid-operated injection valves.

Yes

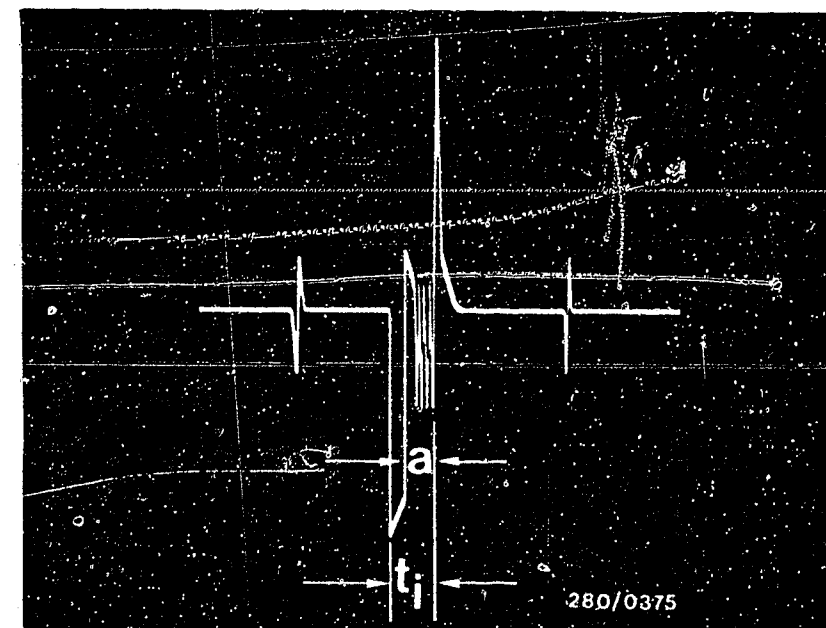
Injection valves
checked for proper
operation?

No

Connect the test lead as follows: The two-pole plug connectors of the test lead are connected between an injection valve and its connecting lead. Of the other two terminals of the test lead, only one must be connected to the special input of the motortester.
Caution: The other terminal must not come into contact with vehicle ground.
When the correct terminal is connected, the diagram shown opposite is visible. Using the test lead, the injection pulses at the injection valves can be tested with an ignition oscilloscope with the engine running. If the diagram opposite is not obtained or if there are deviations (interference, missing etc), the other injection valves should also be tested. In case of interference - check routing of leads. In case of missing: Eliminate loose contacts in leads or in plug-in connections.

Yes

Continued on G15/G16



Injection pulses of a current-regulated output stage (measured at the injection valve).

a = Length of regulation (dependent on engine load)

t_i = Injection pulse

At idle with engine at no load the current regulation "a" is not yet visible on the oscilloscope.

G 13

Uneven engine idle
BMW 5, 6 and 7 series



G 14

Uneven engine idle
BMW 5, 6 and 7 series



Uneven engine idle, speed adjustment (idle) and exhaust-gas adjustment
(Continued)

Air-flow sensor O.K.?

No

Testing:

Unscrew hose between air filter and air-flow sensor. Open air-flow sensor flap by hand. It must be possible to open the air-flow sensor flap with uniform ease from its fully closed position to its fully open position. When released, the flap must close completely by itself. When the air-flow sensor flap is opened it must not catch at any point. Watch for any indications of abrasion or rubbing. Clean air-flow sensor if the inside is very dirty and rub out with a lint-free cloth. If there are any signs of abrasion or rubbing, replace the air-flow sensor. Connect ohmmeter to term. 7 and term. 8 of air-flow sensor. Deflect sensor flap.

Measure resistance:

Test specification:

100...500 Ω

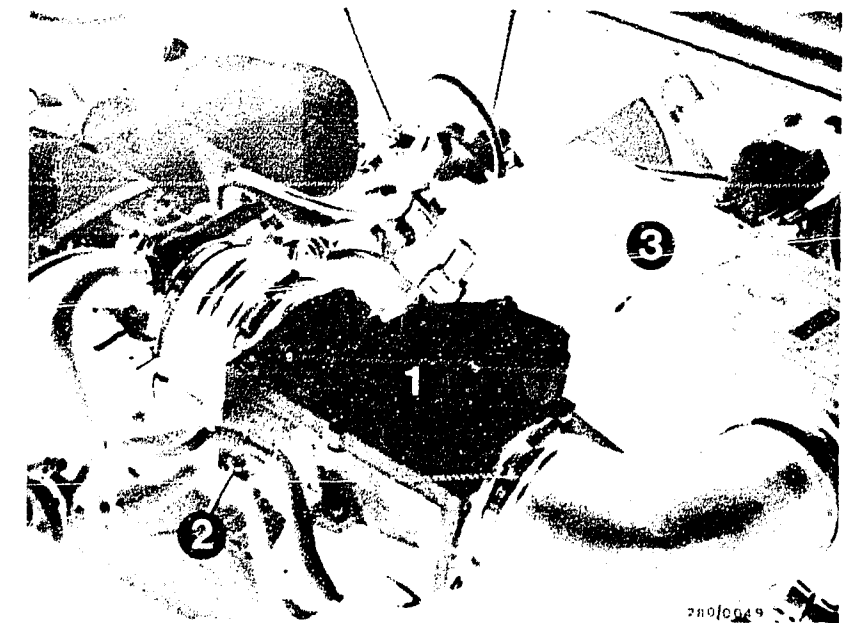
as of FD 049:

200...1000 Ω

Caution!

After testing is completed, refit the hose between air filter and air-flow sensor.

Yes



1 = Air-flow sensor

Continued on G17/G18

G 15

Uneven engine idle

BMW 5, 6 and 7 series



G 16

Uneven engine idle

BMW 5, 6 and 7 series



Uneven engine idle, speed adjustment (idle) and exhaust-gas adjustment

(Continued)

Are all hose lines and electric leads securely connected?
Visual examination. Is the air-intake system leak-tight?

No

Check whether hoses of intake-air system and of fuel line system are correctly attached, not kinked or damaged. If necessary, replace hoses. Eliminate leaks by using new seals or by retightening the connecting screws.
Checking for leaks: Seal off the exhaust tail pipe. Screw off hose from air filter to air-flow sensor on air-flow sensor and seal off air-flow sensor duct. Pull off hose after auxiliary-air device and blow air (0.3 bar) into the intake manifold with a compressed-air gun. Seal off the connection port on the auxiliary-air device. Open the throttle valve fully. Brush or spray all joints with soapy water. Bubbling or foaming indicates a leak. Check electric contacts for loose contacts.

Yes

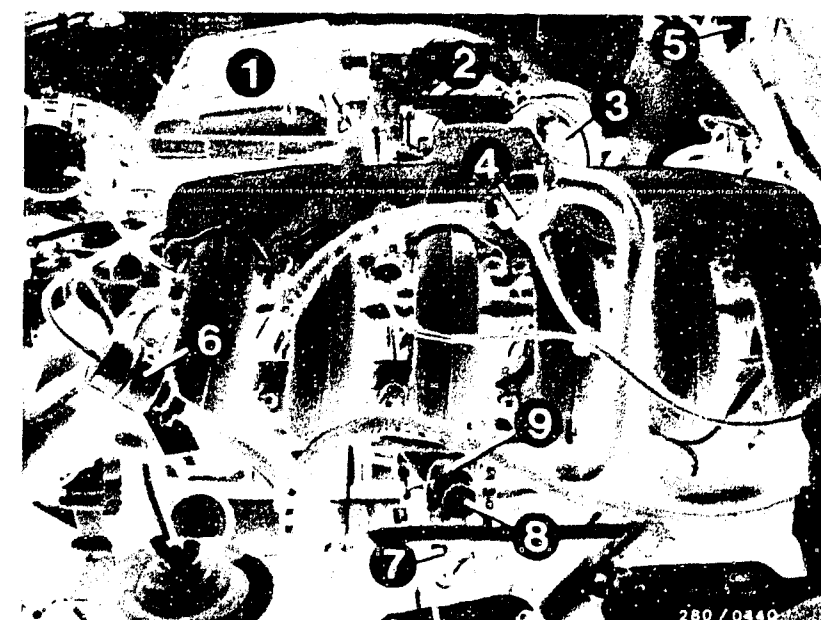
Vacuum limiter (if fitted) O.K.?

No

Pinch off connecting hose before or after the vacuum limiter. Change in engine speed? If yes, replace vacuum limiter. Remove connecting hose before throttle valve and seal off connection port on throttle valve. Accelerate engine briefly. Engine speed approx. 3500 min⁻¹. Close throttle again and check with finger on vacuum hose whether air is being drawn in. If not, replace vacuum limiter.

Yes

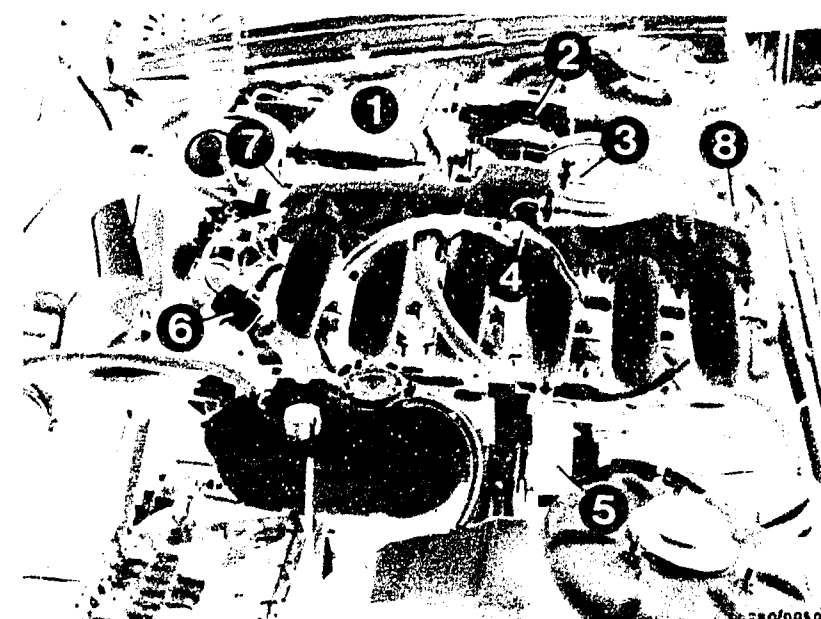
Continued on G19/G20



Up to 7.1979 model

- 1 = Air filter
- 2 = Air-flow sensor
- 3 = Throttle-valve switch
- 4 = Start valve
- 5 = Relay set
- 6 = Pressure regulator
- 7 = Thermo-time switch
- 8 = Auxiliary-air device
- 9 = Temperature sensor II (engine)

As of 8.1979 model



G17

Uneven engine idle

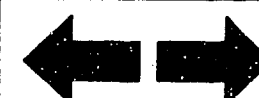
BMW 5, 6 and 7 series



G18

Uneven engine idle

BMW 5, 6 and 7 series



Uneven engine idle, speed adjustment (idle) and exhaust-gas adjustment
(Continued)

CO and idle speed
correctly adjusted?

No

CO and idle adjustment

Exhaust-gas test with CO analyzer with engine at normal operating temperature and at idle speed.

Idle speed

Manually-shifted transmission and automatic transmission (selector lever in position P): $850 \dots 950 \text{ min}^{-1}$

CO setting

Test specification: $0.5 \dots 2.0 \text{ \% by vol. CO}$

Sweden version with secondary air:

$0.3 \dots 0.5 \text{ \% by vol. CO}$

If CO concentration too high, turn bypass screw (CO adjusting screw) in air-flow sensor half a turn in a counterclockwise direction. Check idle speed and CO concentration again. Carry out adjustments in several steps. After adjusting, use new plugs.

Yes

Testing completed for
customer complaint

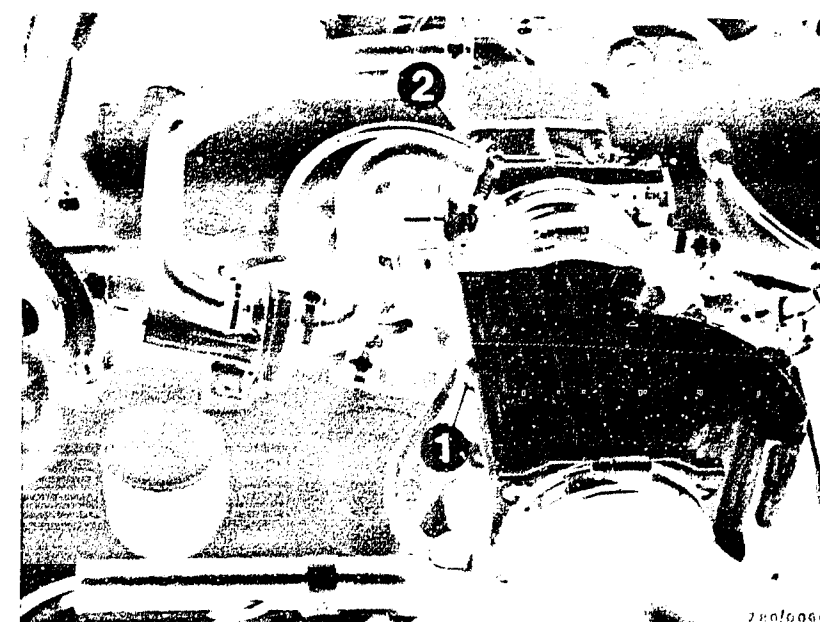
"Uneven engine idle"

Customer complaint
remedied?

No

Further possibilities:

- Customer complaint incorrectly diagnosed (see Coordinates B3...B8). If the fault has not been detected by "direct trouble-shooting", see "detailed trouble-shooting" (Coordinate B3/B4).
- Engine not mechanically O.K. (Compression, valve setting, valve timing, worn camshaft).



1 = CO adjusting screw

2 = Idle-speed-adjusting screw

G 19

Uneven engine idle
BMW 5,6 and 7 series



G 20

Uneven engine idle
BMW 5, 6 and 7 series



Trouble-shooting program according to customer complaints

How to use the following trouble-shooting program

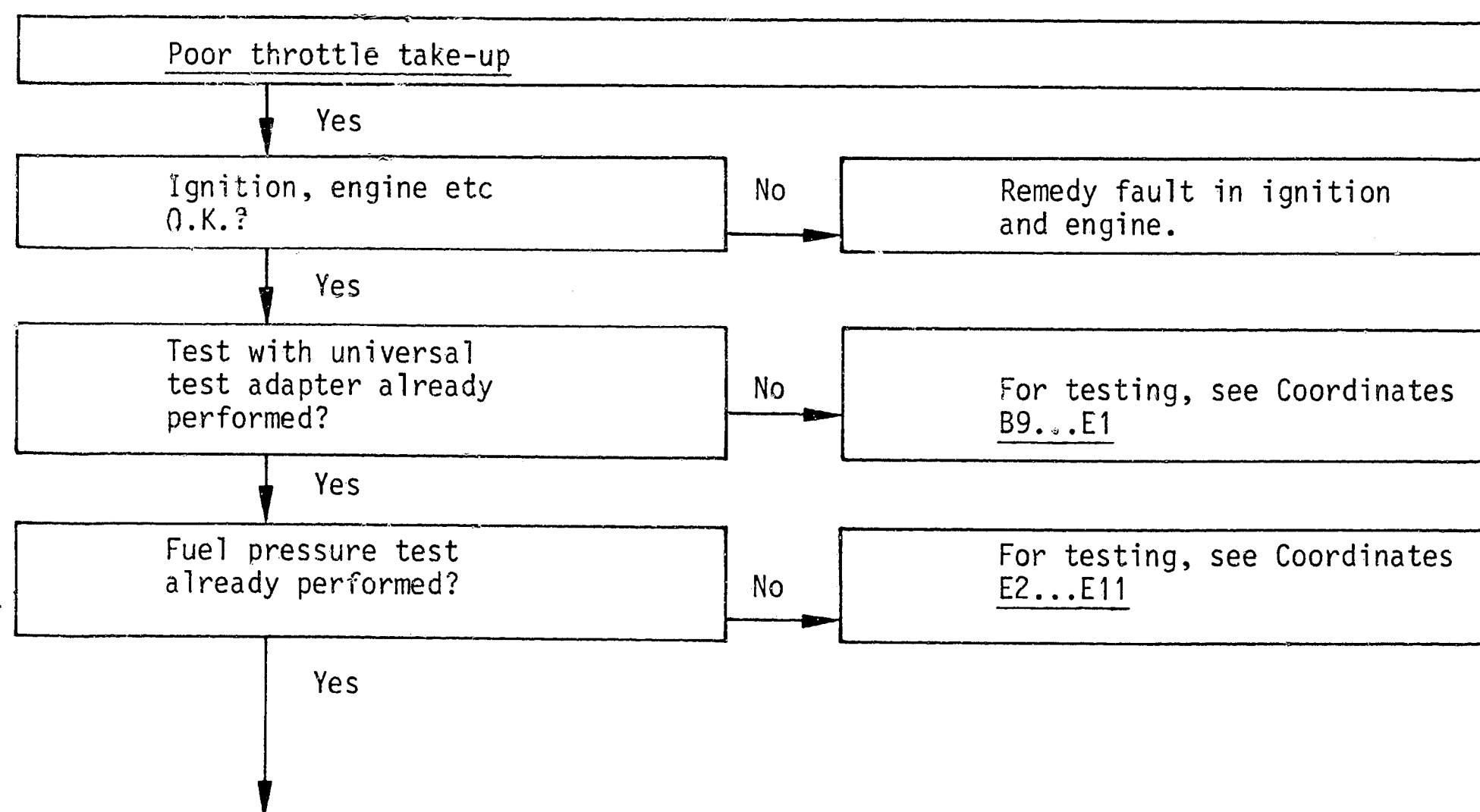
The program is divided into three rows of boxes:

1. The left-hand row contains the questions on the tests.
2. The middle row contains descriptions of the testing and adjustment operations on the components.
3. The right-hand row contains the illustrations belonging to the text and explains the illustrations.

If the questions can be answered conclusively with "yes" without testing, proceed to the next question below.

If, on the other hand, the answer to the question is "no", and you suspect a fault, branch to the middle row of boxes and carry out the tests given there.

When you have finished testing continue trouble-shooting at the point at which you branched off.



Continued on H3/H4

H1

Poor throttle take-up
BMW 5, 6 and 7 series



H2

Poor throttle take-up
BMW 5, 6 and 7 series



Poor throttle take-up (Continued)

Throttle valve closed?

No

Yes

Testing:

Throttle valve closed?

Check whether the throttle valve can be closed still further and whether the engine speed thereby drops.

Set the throttle valve to a hair's breadth gap.

Caution: Throttle valve must not stick.

Setting the throttle-valve switch:

As of 8.79 model

Loosen fastening screws slightly. Connect ohmmeter to term. 2 and term. 18. Turn throttle-valve switch to the right until the idle contact closes (reading 0Ω).

Checking the setting:

Pull slightly on the throttle cable. The idle contact must open (reading $\infty \Omega$).

Up to 7.79 model

Connect ohmmeter to term. 2 and term. 18.

Loosen fastening screws (1) slightly.

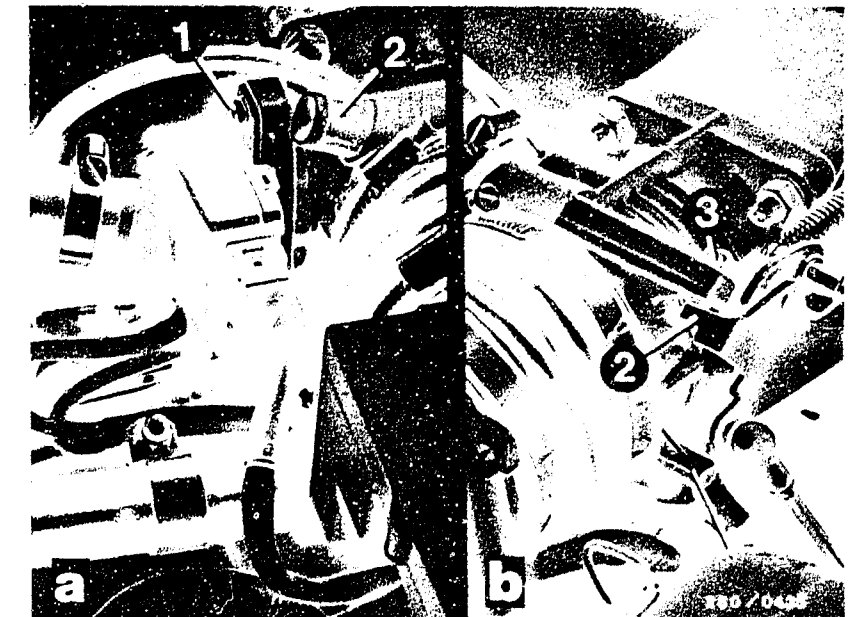
Open throttle valve until the stop bracket (2) is approx. 3 mm from the stop screw (3). Starting from the open idle contact (reading $\infty \Omega$), turn the throttle-valve switch until the idle contact closes (reading 0Ω).

Trouble-shooting:

Test the following leads for continuity with ohmmeter (set value approx. 0Ω):

From multiple plug term. 2 to throttle-valve switch term. 2, from throttle-valve switch term. 18 to multiple plug term. 18.

Eliminate contact resistances in the plug-in connections.



Up to 7.1979 model:

1 = Fastening screws

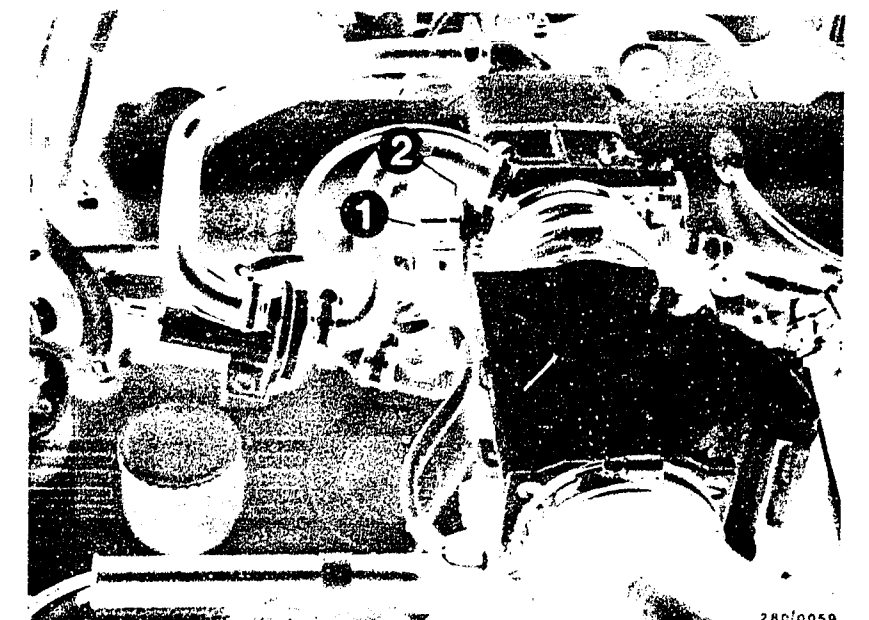
2 = Stop bracket

3 = Stop screw

As of 8.1979 model:

1 = Throttle-valve switch

2 = Fastening screws



Continued on H5/H6

H3

Poor throttle take-up
BMW 5, 6 and 7 series



H4

Poor throttle take-up
BMW 5, 6 and 7 series



Poor throttle take-up (Continued)

Auxiliary-air device tested
(mechanically O.K.?)

No

Yes

Testing:

1. Visual examination of auxiliary-air device.

When cold, the device must be open, when the engine is warm, it must be closed. If not, replace auxiliary-air device. (Remove hoses and look down, possibly using a small mirror).

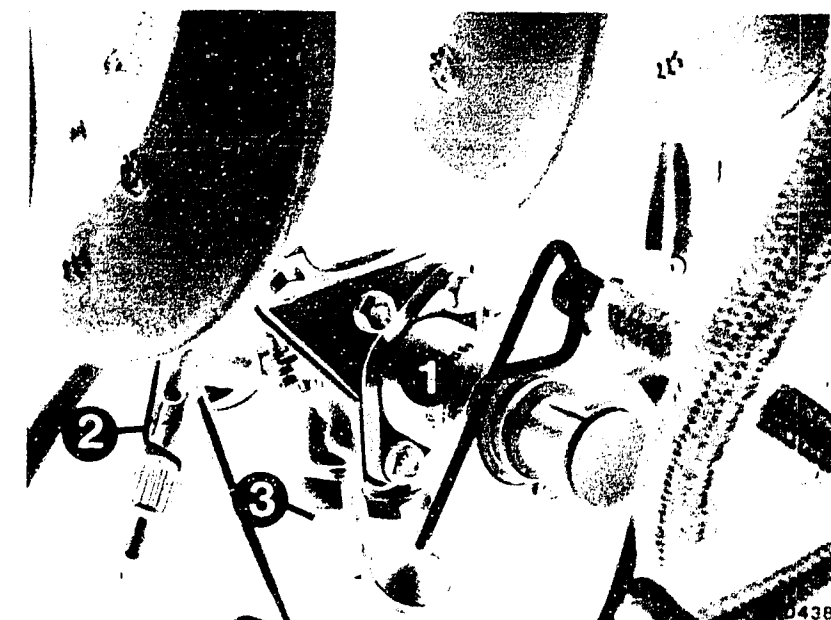
2. Functional test of auxiliary-air device:

With the engine cold, pinch off hose to auxiliary-air device. Engine speed must drop. With the engine warm, pinch off hose to auxiliary-air device. Engine speed must not drop. If incorrect, replace auxiliary-air device (pay attention to direction of flow).

Only up to 7.79 model:

Before removing the auxiliary-air device, pinch off the hoses on the left and right of the coolant reservoir using hose clampers (2). The auxiliary-air device is screwed into a small coolant reservoir which is mounted on the engine via a metal plate and 3 rubber-metal buffers.

Remove hoses to auxiliary-air device (1) and observe the device through the lower tailpiece. The device must be partially open when the engine is cold (either use a small mirror, or unscrew the auxiliary-air device). If replacing, pay attention to the direction of flow of auxiliary-air device.



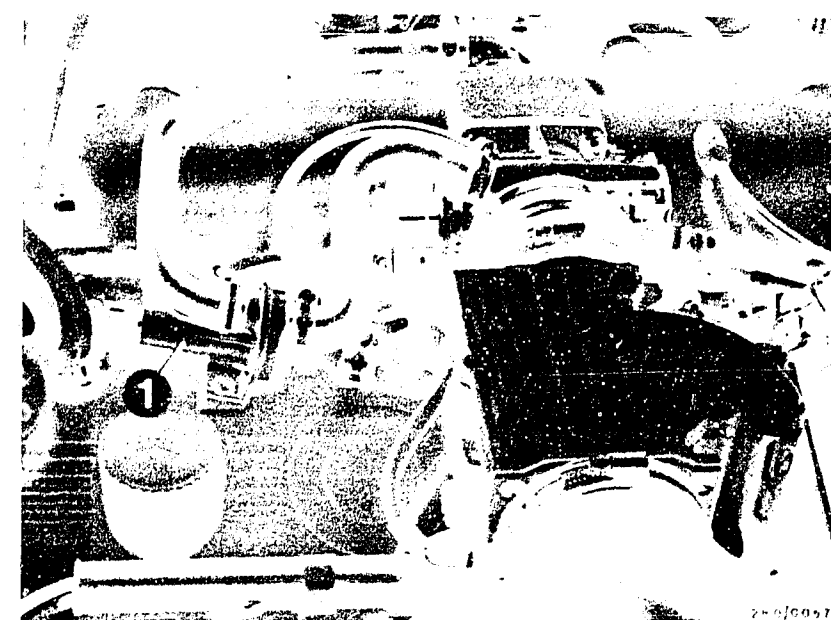
Up to 7.79 model

1 = Auxiliary-air device

2 = Hose clammer

As of 8.79 model

1 = Auxiliary-air device



Continued on H7/H8

H5

Poor throttle take-up

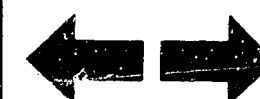
BMW 5, 6 and 7 series



H6

Poor throttle take-up

BMW 5, 6 and 7 series



Poor throttle take-up (Continued)

Air-flow sensor O.K.?

No

Testing:

Unscrew hose between air filter and air-flow sensor. Open air-flow sensor flap by hand. It must be possible to open the air-flow sensor flap with uniform ease from its fully closed position to its fully open position. When released, the flap must close completely by itself. When the air-flow sensor flap is opened it must not catch at any point. Watch for any indications of abrasion or rubbing. Clean air-flow sensor if the inside is very dirty and rub out with a lint-free cloth. If there are any signs of abrasion or rubbing, replace the air-flow sensor. Connect ohmmeter to term. 7 and term. 8 of air-flow sensor.

Measure resistance.

Deflect air-flow sensor flap.

Test specification

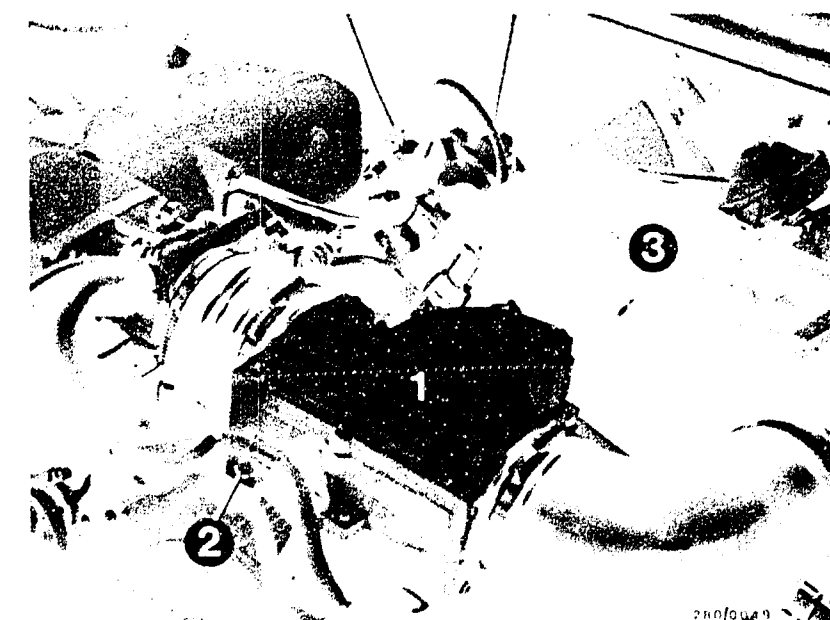
as of FD 049:

100...500 Ω

200...1000 Ω

Yes

Continued on H9/H10



1 = Air-flow sensor

H7

Poor throttle take-up
BMW 5, 6 and 7 series



H8

Poor throttle take-up
BMW 5, 6 and 7 series

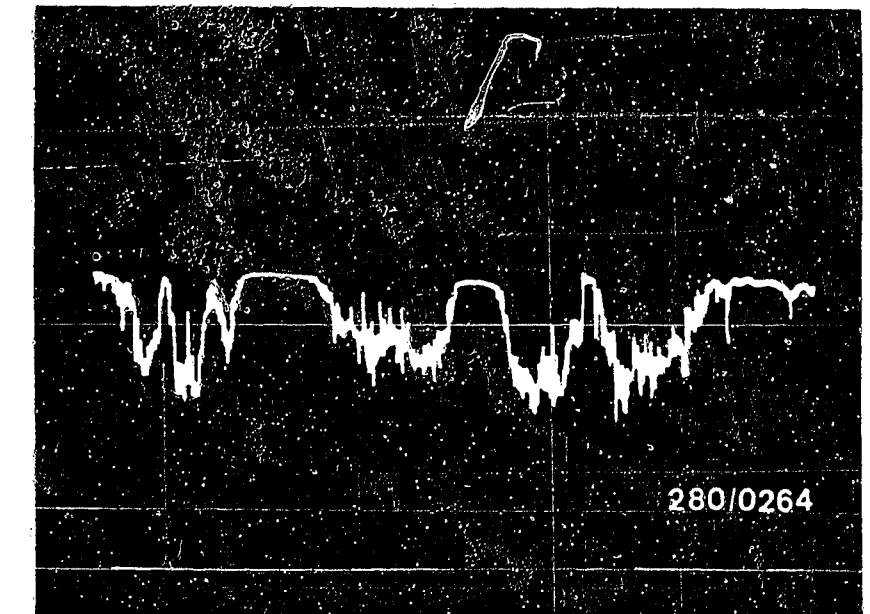


Poor throttle take-up (Continued)

Yes

Potentiometer test: (Noise test)
Leave plug on. Set motortester to "special input" and, using the special cable, connect to air-flow sensor term. 7 (red clip) and term. 6 (black clip). Set control lever for image adjustment on motortester as far as it will go to the left (calibrated setting). Ignition "ON", deflect air-flow sensor flap suddenly (several times). If noise signal incorrect (see illustration), replace air-flow sensor. After testing, be sure to check the terminals for security.

Caution!
After testing is completed, refit the hose between air filter and air-flow sensor.



Incorrect noise signal

Continued on H11/H12

H9

Poor throttle take-up
BMW 5, 6 and 7 series



H10

Poor throttle take-up
BMW 5, 6 and 7 series



Poor throttle take-up (Continued)

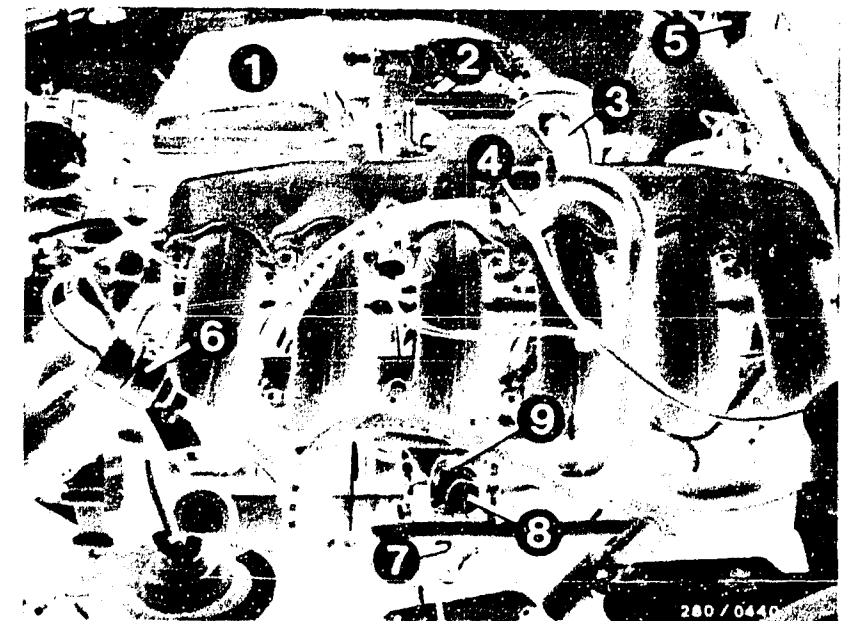
Are all hose lines and electric leads securely connected?
Visual examination. Is the air-intake system leak-tight?

No

Check whether hoses of intake-air system and of fuel line system are correctly attached, not kinked or damaged. If necessary, replace hoses. Eliminate leaks by using new seals or by retightening the connecting screws.
Checking for leaks:
Seal off the exhaust tail pipe. Screw off hose from air filter to air-flow sensor on air-flow sensor and seal off air-flow sensor duct. Pull off hose after auxiliary-air device and blow air (0.3 bar) into the intake manifold with a compressed-air gun. Seal off the connection port on the auxiliary-air device. Open the throttle valve fully. Brush or spray all joints with soapy water. Bubbling or foaming indicates a leak. Check electric contacts for loose contacts.

Yes

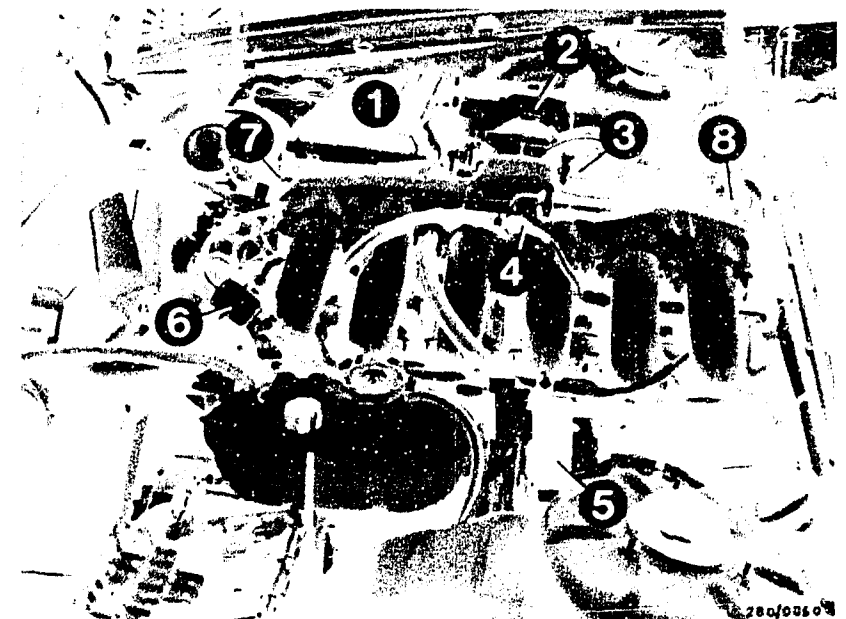
Continued on H13/H14



Up to 7.1979 model

- 1 = Air filter
- 2 = Air-flow sensor
- 3 = Throttle-valve switch
- 4 = Start valve
- 5 = Relay set
- 6 = Pressure regulator
- 7 = Thermo-time switch
- 8 = Auxiliary-air device
- 9 = Temperature sensor II (engine)

As of 8.1979 model



H11

Poor throttle take-up
BMW 5,6 and 7 series



H12

Poor throttle take-up
BMW 5, 6 and 7 series



Poor throttle take-up (Continued)

CO and idle speed
correctly adjusted?

No

CO and idle adjustment

Exhaust-gas test with CO analyzer with
engine at normal operating temperature
and at idle speed.

Idle speed

Manually-shifted transmission and auto-
matic transmission (selector lever in
position P): 850...950 min⁻¹

CO setting

Test specification: 0.5...2.0 % by vol. CO

Sweden version with
secondary air:

0.3...0.5 % by vol. CO

If CO concentration too high, turn bypass
screw (CO adjusting screw) in air-flow
sensor half a turn in a counterclockwise
direction. Check engine speed and CO
concentration again. Carry out adjustments
in several steps. After adjusting, use
new plugs.

Can idle speed not
be adjusted?

Yes

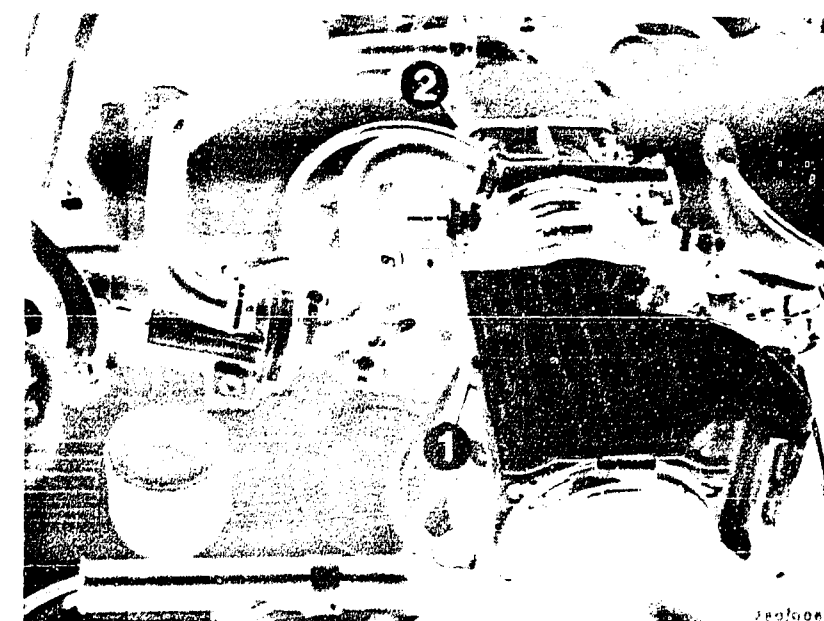
Testing completed for
customer complaint
"Poor throttle take-up"

Customer complaint
remedied?

No

Further possibilities:

- Customer complaint incorrectly diagnosed
(see Coordinates B3...B8). If the
fault has not been detected by "direct
trouble-shooting", see "detailed trouble-
shooting" (Coordinate B3/B4).
- Engine not mechanically O.K.
(Compression, valve setting, valve timing,
worn camshaft).



1 = CO adjusting screw
2 = Idle-speed-adjusting screw

H13

Poor throttle take-up
BMW 5,6 and 7 series



H14

Poor throttle take-up
BMW 5, 6 and 7 series



Trouble-shooting program according to customer complaints

How to use the following trouble-shooting program

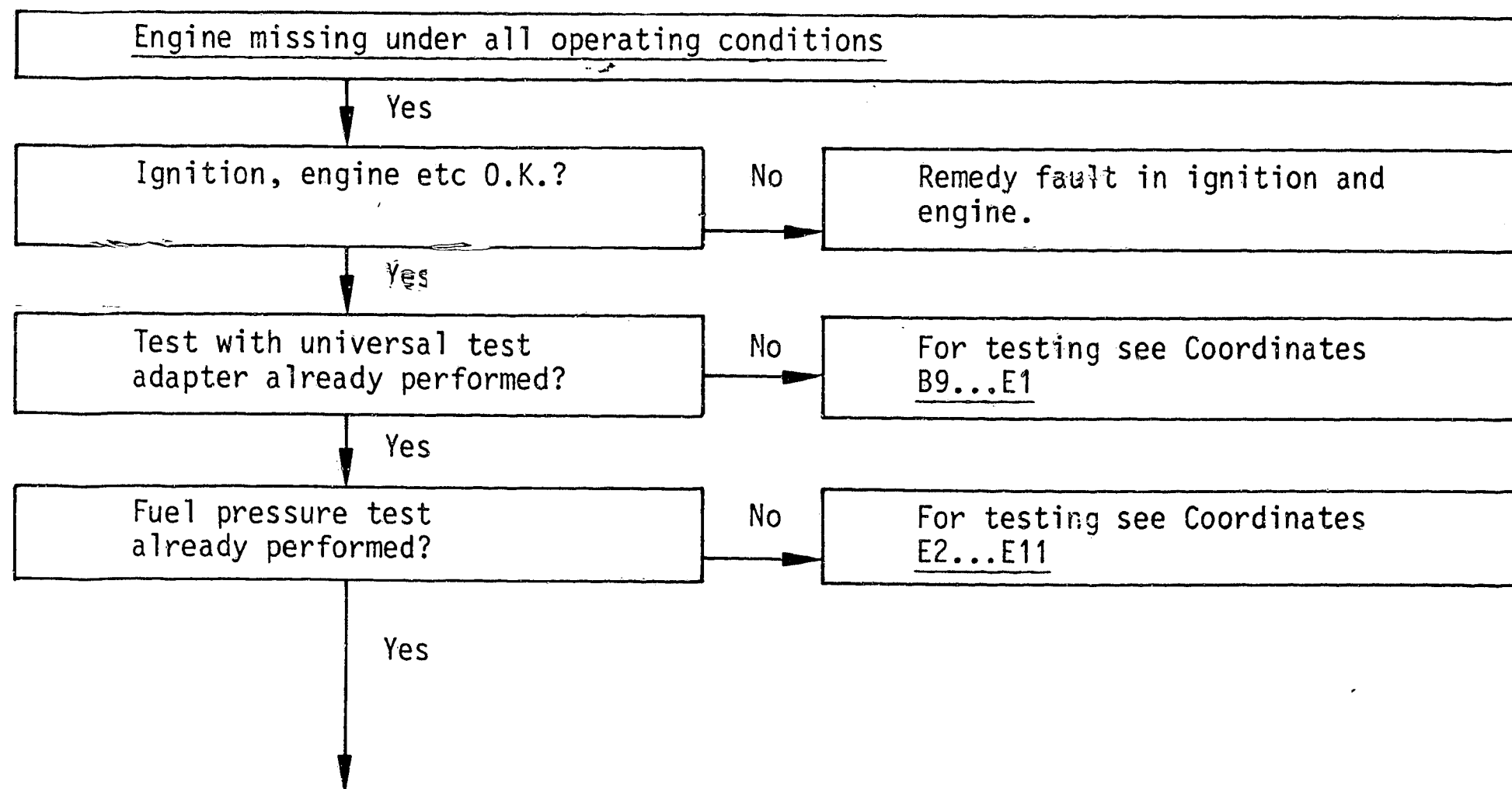
The program is divided into three rows of boxes:

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2. The middle row contains descriptions of the testing and adjustment operations on the components.
3. The right-hand row contains the illustrations belonging to the text and explains the illustrations.

If the questions can be answered conclusively with "yes" without testing, proceed to the next question below.

If, on the other hand, the answer to the question is "no", and you suspect a fault, branch to the middle row of boxes and carry out the tests given there.

When you have finished testing continue trouble-shooting at the point at which you branched off.



Continued on H17/H18

H 15

Engine missing under all op. conditions
BMW 5, 6 and 7 series

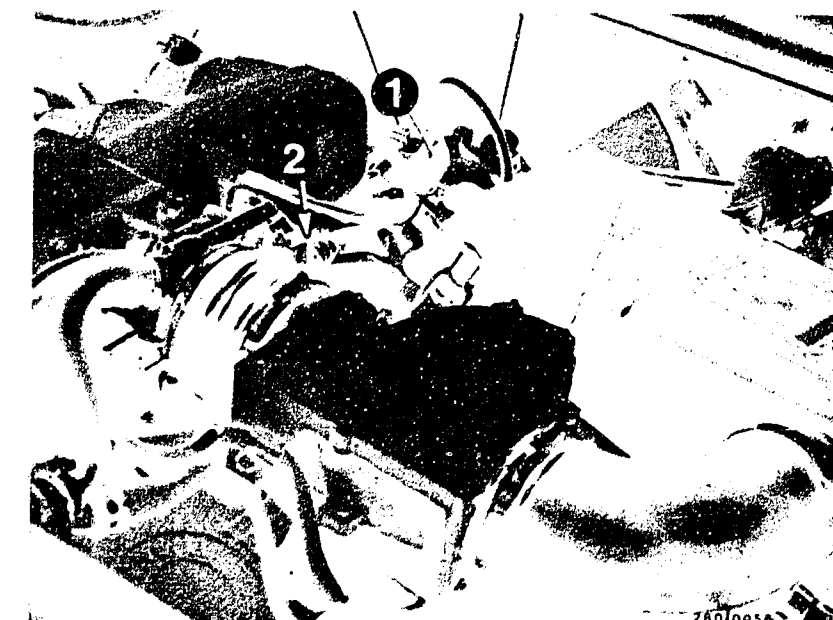
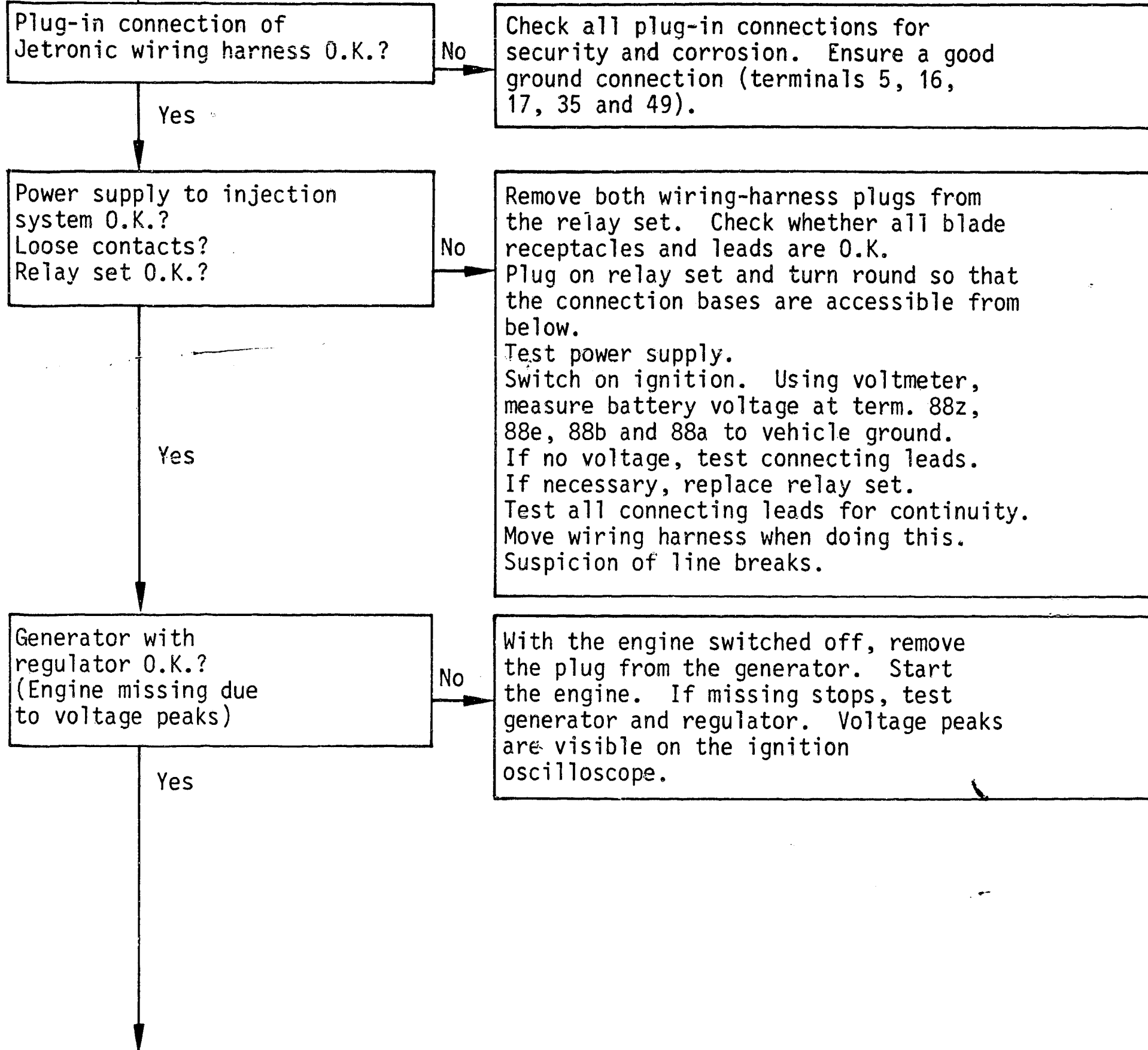


H 16

Engine missing under all op. conditions
BMW 5, 6 and 7 series

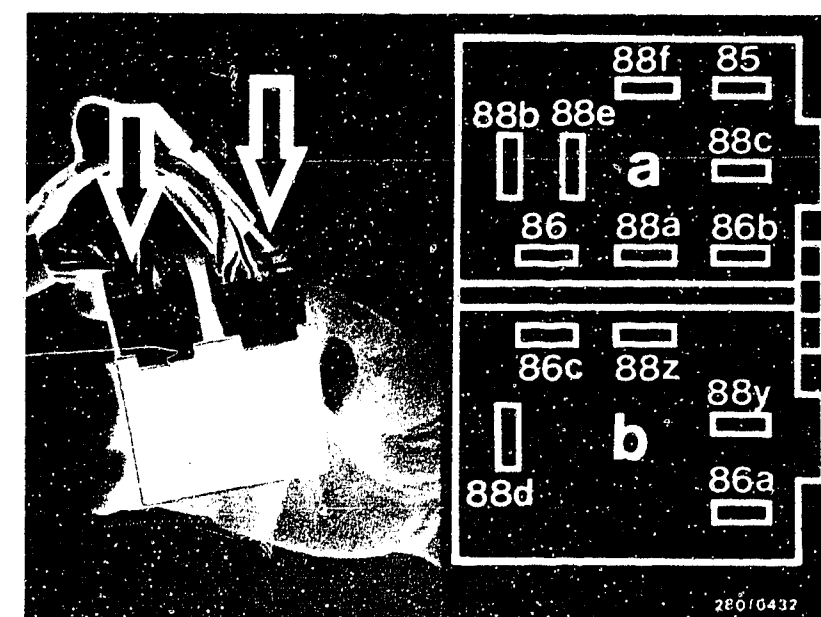


Engine missing under all operating conditions (Continued)



1 = Thermo-time switch
2 = (Arrow) Central ground

Measure voltage on back of plug.
a = Jetronic wiring harness
b = Vehicle wiring harness
(No term. 88f on relay set 0 332 514 105).



Continued on H19/H20

H17

Engine missing under all op. conditions
BMW 5, 6 and 7 series



H18

Engine missing under all op. conditions
BMW 5, 6 and 7 series



Engine missing under all operating conditions (Continued)

Solenoid-operated injection valves checked for proper operation?

No

Connect test lead as follows:
The two-pole plug connectors of the test lead are connected between an injection valve and its connecting lead. Of the other two terminals of the test lead, only one must be connected to the special input of the motortester.

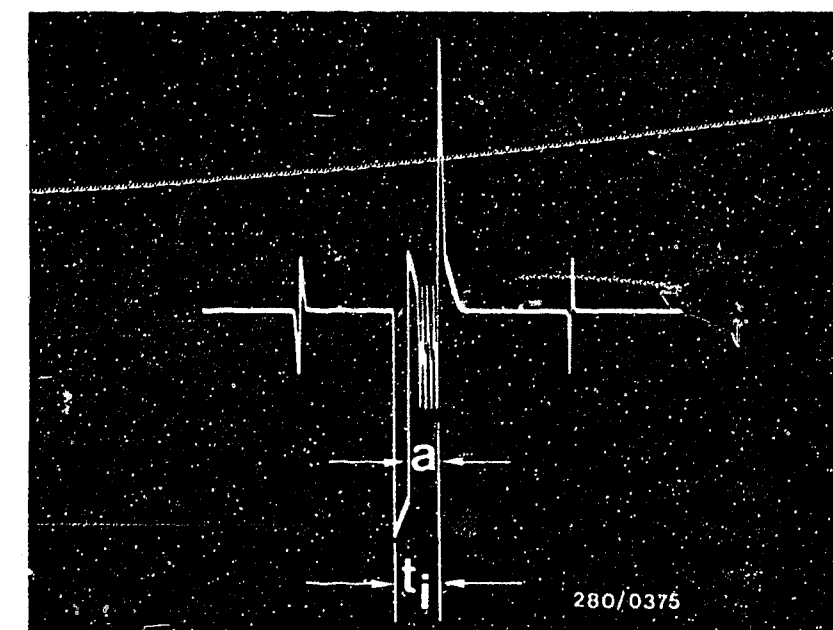
Caution:

The other terminal must not come into contact with vehicle ground.

When the correct terminal is connected, the diagram shown opposite is visible. Using the test lead, the injection pulses at the injection valves can be tested with an ignition oscilloscope with the engine running.

If the diagram opposite is not obtained or if there are deviations (interference, missing etc), the other injection valves should also be tested. In case of interference - check routing of leads. In case of missing: Eliminate loose contacts in leads or in plug-in connections.

Yes



Injection pulse of current regulated output stage (measured at the injection valve).

a = Length of regulation (dependent on engine load)

t_i = Injection pulse

At idle with engine at no load the current regulation "a" is not yet visible on the oscilloscope.

Continued on H21/H22

H19

Engine missing under all op. conditions
BMW 5, 6 and 7 series



H20

Engine missing under all op. conditions
BMW 5, 6 and 7 series



Engine missing under all operating conditions (Continued)

Air-flow sensor O.K.?

No

Testing:

Unscrew hose between air filter and air-flow sensor. Open air-flow sensor flap by hand. It must be possible to open the air-flow sensor flap with uniform ease from its fully closed position to its fully open position. When released, the flap must close completely by itself. When the air-flow sensor flap is opened it must not catch at any point. Watch for any indications of abrasion or rubbing. Clean air-flow sensor if the inside is very dirty and rub out with a lint-free cloth. If there are any signs of abrasion or rubbing, replace the air-flow sensor. Connect ohm-meter to term. 7 and term 8 of air-flow sensor.

Measure resistance.

Deflect air-flow sensor flap.

Test specification:

100...500 Ω

as of FD 049:

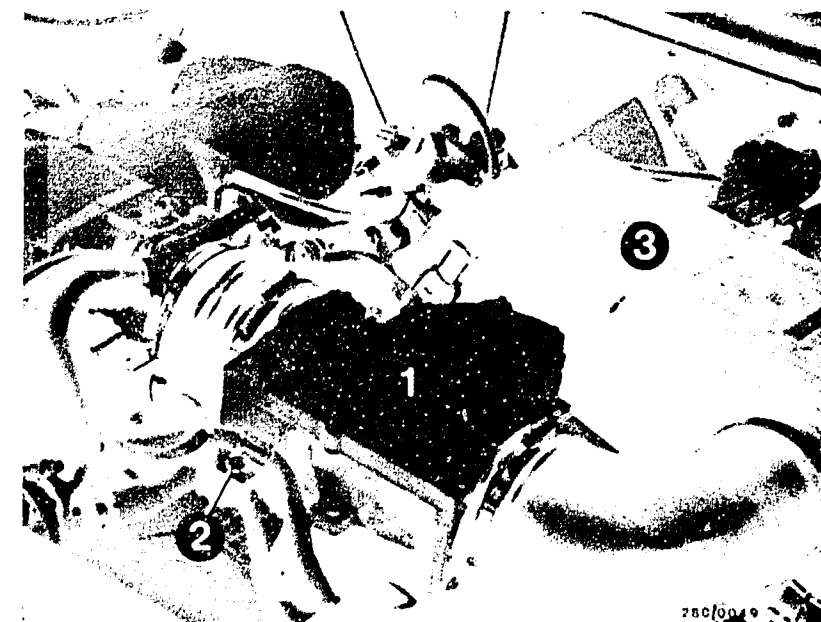
200...1000 Ω

Potentiometer test: (Noise test)

Leave plug on. Set motortester to "special input" and, using the special cable, connect to air-flow sensor term. 7 (red clip) and term. 6 (black clip). Set control lever for image adjustment on motor-tester as far as it will go to the left (calibrated setting). Ignition "ON".

Yes

Continued on J1/J2



1 = Air-flow sensor

H21

Engine missing under all op. conditions
BMW 5, 6 and 7 series



H22

Engine missing under all op. conditions
BMW 5, 6 and 7 series



Engine missing under all operating conditions (Continued)

Yes

Deflect air-flow sensor flap suddenly (several times). If noise signal incorrect (see illustration), replace air-flow sensor. After testing, be sure to check the terminals for security.

Engine stopped while hot:

Remove plug from air-flow sensor and connect ohmmeter to term. 6 and term. 36.

Positive pole of ohmmeter to term. 6: approx. 0Ω .

With reversed polarity: approx. $\infty \Omega$.

Procedure if incorrect:

1. Air-flow sensor up to FD 040:

Replace air-flow sensor.

2. Air-flow sensor as of FD 041:

a) Faulty contacting of plug connector 88z, 86c and 85 on relay set. Remedy as appropriate.

b) Pump contact bent.

Checking the CO adjustment:

Test specification: $0.5...2.0 \%$ by vol. CO

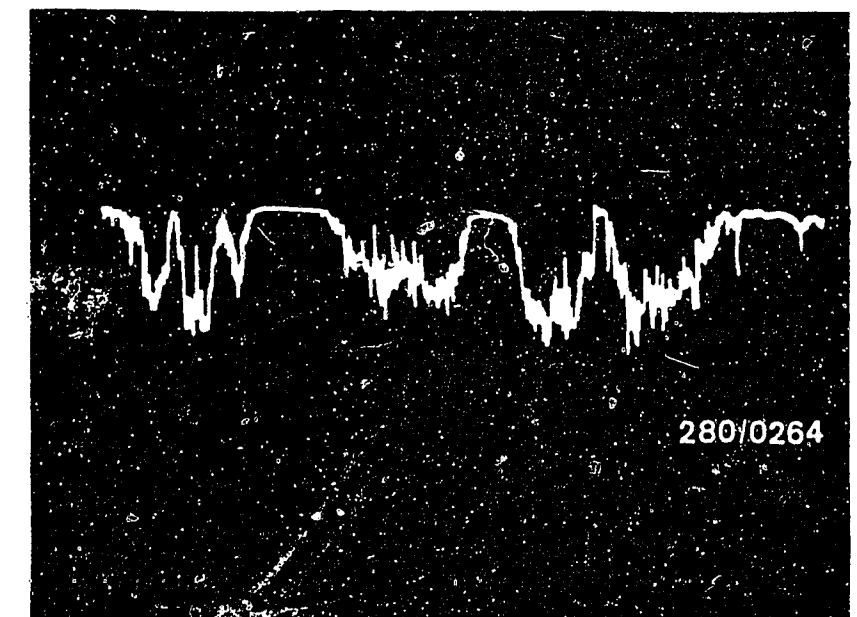
Sweden version with secondary air

Test specification: $0.3...0.5 \%$ by vol. CO

Idle setting: $800...900 \text{ min}^{-1}$

Check engine inlet valves (valve clearance too tight).

If the air-flow sensor is completely O.K. apart from the pump contact, it is possible to proceed as follows:
(See installation diagrams opposite).



Incorrect noise signal

1 = Fuel pump relay

Striebel Co. (89 64 60)

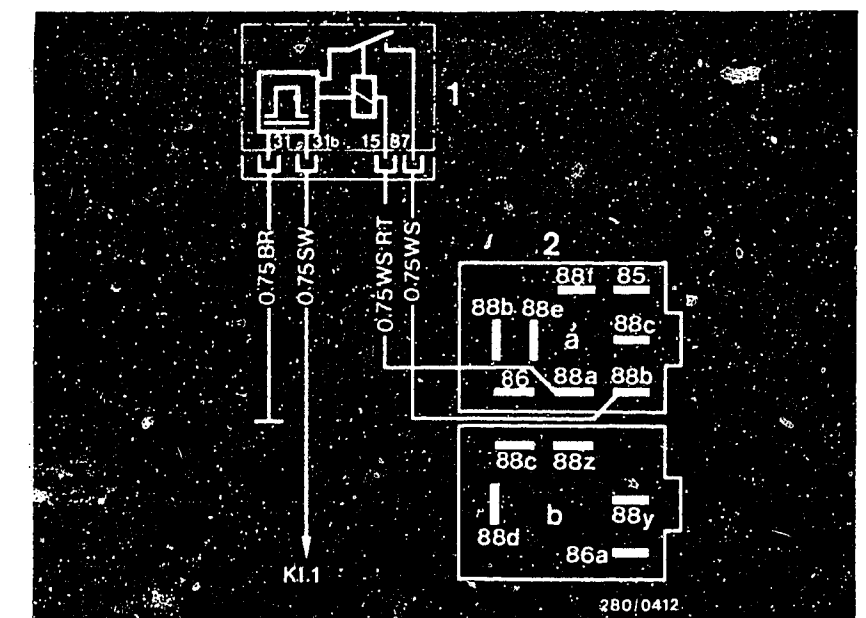
2 = Relay set

Connection base viewed from below

a = Jetronic wiring harness

b = Vehicle wiring harness

Wiring harness for user-fabrication



Continued on J3/J4

J1

Engine missing under all op. conditions
BMW 5, 6 and 7 series



J2

Engine missing under all op. conditions
BMW 5, 6 and 7 series



Engine missing under all operating conditions (Continued)

Yes

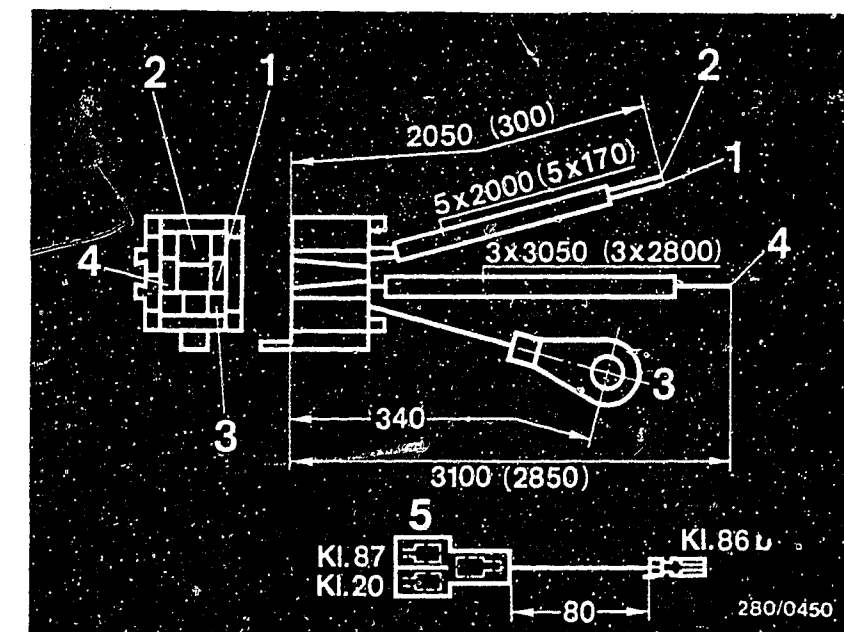
Installation instructions:

Plug the relay base for the fuel pump relay into the fuse box. Connect the brown lead of the user-fabricated wiring harness to the ground point (at front on fuse box). Remove the relay set.

Run the white and red/white leads of the user-fabricated wiring harness along the Jetronic wiring harness to the relay set and connect to relay set in accordance with circuit diagram. Run the black lead of the user-fabricated wiring harness along the Jetronic wiring harness as far as the relay set and from there along the windshield washer hose to the ignition coil. Connect lead to ignition coil term. 1.

Caution!

After testing is completed, refit hose between air filter and air-flow sensor.



Wiring harness to be user-fabricated as per drawing. (Dimensions in parentheses for 5 and 6 series)

- 1 = Fuel pump relay term. 15 to relay set term. 88a (0.75 mm² colour white/red)
- 2 = Fuel pump relay term. 87 to distributor term. 87 (0.75 mm² colour white)
- 3 = Fuel pump relay term. 31 to ground (0.75 mm² colour brown)
- 4 = Fuel pump relay term. 31b to ignition coil term.1 (0.75 mm² colour black)
- 5 = Distributor
Term. 87 to fuel pump relay and term. 20 to control unit.
Term. 88b to relay set

Continued on J5/J6

J3

Engine missing under all op. conditions
BMW 5, 6 and 7 series



J4

Engine missing under all op. conditions
BMW 5, 6 and 7 series



Engine missing under all operating conditions (Continued)

Fuel delivery O.K.?

No

Measuring the fuel delivery: For testing, undo the junction between the fuel return hose (from pressure regulator) and fuel return line (to fuel tank). If necessary, extend hose and lead into a 5 l vessel with graduated scale. Remove air hose to air filter on air-flow sensor. Ignition "ON". Open air-flow sensor flap by hand until pump operates.

Test specification

2.8 l engine: min. 850 cm³/30 s

3.3 l engine: min. 900 cm³/30 s

3.5 l engine: min. 950 cm³/30 s

Remedy if test specification not reached:

- Fuel filter clogged → replace.
- Voltage at fuel pump plugs, with engine running, min. 12 V. If not, clean contacts; possibly eliminate poor ground connection or replace leads.
- Fuel pressure regulator defective → replace.
- Fuel pump delivery too low → replace fuel pump.

Caution: After testing is completed, refit hose between air filter and air-flow sensor.

Yes

Control unit O.K.?

No

Let engine run. Shake control unit lightly and move multiple plug. Watch for engine missing. Repair plug-in connection on multiple plug or replace defective control unit.

Yes

Continued on J7/J8



1 = Pressure regulator
2 = Fuel return hose

J5

Engine missing under all op. conditions
BMW 5, 6 and 7 series



J6

Engine missing under all op. conditions
BMW 5, 6 and 7 series



Engine missing under all operating conditions (Continued)

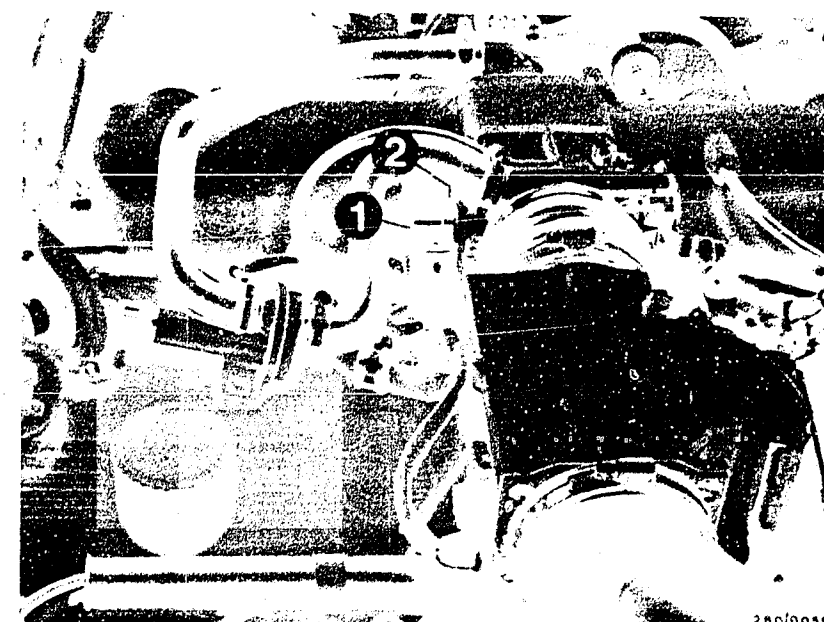
Burbling on the over-run?
Throttle valve closed?
CO idle adjustment O.K.?

No

1. Check the exhaust system for leaks.
2. Throttle valve closed?
Check whether the throttle valve can be closed still further and whether the engine speed thereby drops.
3. Adjusting the throttle-valve switch:
Loosen fastening screws slightly. Connect ohmmeter to term. 2 and term. 18. Turn throttle-valve switch to the right until the idle contact (microswitch) can be heard to click. (Reading 0Ω).
Checking the adjustment: Pull slightly on throttle cable. The idle contact must be heard to click (reading $\infty \Omega$).
Trouble-shooting: Test the following leads for continuity using ohmmeter (set value approx. 0Ω).
From multiple plug term. 2 to throttle-valve switch term. 2. From throttle-valve switch term. 18 to multiple plug term. 18.
Eliminate contact resistances in the plug-in connections.
- 4.1 Testing the overrun cutoff:
Bring the warmed-up engine to 4000 min^{-1} .
Using insulated wire, bridge term. 2 and term. 18 in the plug of the throttle-valve switch.
Down to approx. 3600 min^{-1} there must be no injection pulses. Below approx. 3600 min^{-1} the injection pulses must be present again.
Control unit ..1 108 (as of FD 044):
(Orange-coloured dot on control unit up to FD 046) down to approx. 3000 min^{-1} there must be no injection pulses. Below approx. 3000 min^{-1} the injection pulses must be present again.

Yes

Continued on J9/J10



1 = Throttle-valve switch
2 = Fastening screws

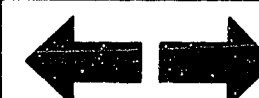
J7

Engine missing under all op. conditions
BMW 5, 6 and 7 series



J8

Engine missing under all op. conditions
BMW 5, 6 and 7 series



Engine missing under all operating conditions (Continued)

Yes

4.2 Testing the overrun cutoff with a motortester:

Connect the test lead as follows:

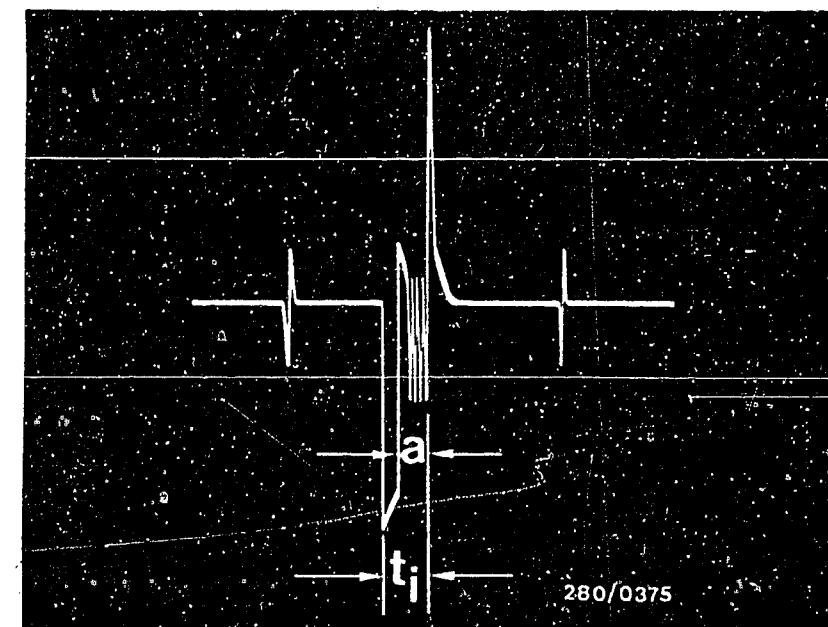
The two-pole plug connectors of the test lead are connected between an injection valve and its connecting lead. Of the other two terminals of the test lead, only one must be connected to the special input of the motortester.

Caution: The other terminal must not come into contact with vehicle ground.

When the correct terminal is connected, the oscilloscope pattern opposite is visible. Bring the warmed-up engine to 4000 min^{-1} . Foot off accelerator → idle contact closes. No injection pulses must be visible. As of 3600 min^{-1} or 3000 min^{-1} respectively the injection pulses must be visible again.

5. Testing the vacuum limiter
(Sweden version only)

Remove connecting hose before throttle valve and seal off connection port on throttle valve. Briefly accelerate engine, engine speed approx. 3500 min^{-1} . When throttle is closed check vacuum hose with finger to see if air is being drawn in. If not, replace vacuum limiter.



Injection pulse of a current-regulated output stage.
(Measured at injection valve)

a = Length of regulation
 t_i = Injection pulse

At idle with no load on engine "a" is not yet visible on the oscilloscope.

Continued on J11/J12

J9

Engine missing under all op. conditions
BMW 5, 6 and 7 series



J10

Engine missing under all op. conditions
BMW 5, 6 and 7 series



Engine missing under all operating conditions (Continued)

CO and idle speed
correctly adjusted?

No

6. CO and idle adjustment

Exhaust-gas test with CO analyzer with
engine at normal operating temperature
and at idle speed.

Idle speed

Manually-shifted transmission and auto-
matic transmission (selector lever in
position P): $850 \dots 950 \text{ min}^{-1}$

CO setting

Test specification: $0.5 \dots 2.0 \%$ by vol. CO

Sweden version with
secondary air: $0.3 \dots 0.5 \%$ by vol. CO

If CO concentration too high, turn bypass
screw (CO adjusting screw) in air-flow
sensor half a turn in a counterclockwise
direction. Check engine speed and CO con-
centration again. Carry out adjustments
in several steps. After adjusting, use
new plugs.

Yes

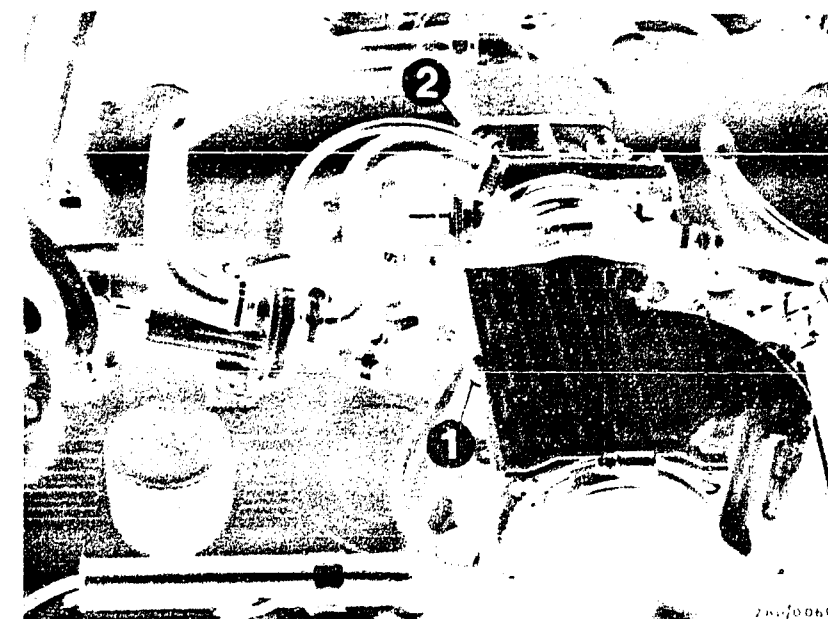
Can idle speed not be
adjusted?

Yes

Leak test performed at valve
cover, engine-oil filler neck
and oil dipstick?

Yes

Continued on J13/J14



1 = CO adjusting screw
2 = Idle-speed adjusting screw

J11

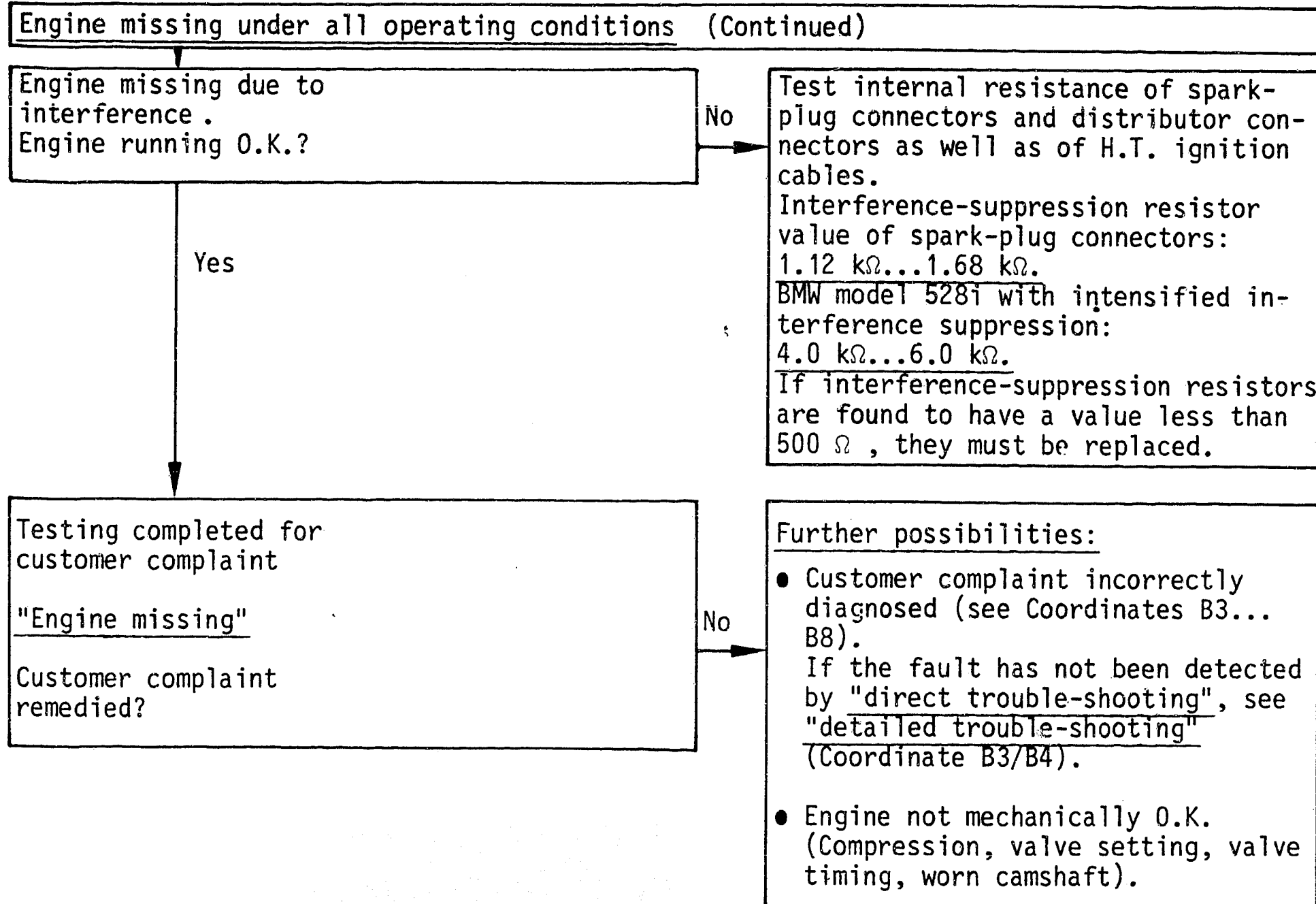
Engine missing under all op. conditions
BMW 5, 6 and 7 series



J12

Engine missing under all op. conditions
BMW 5, 6 and 7 series





Trouble-shooting program according to customer complaints

How to use the following trouble-shooting program

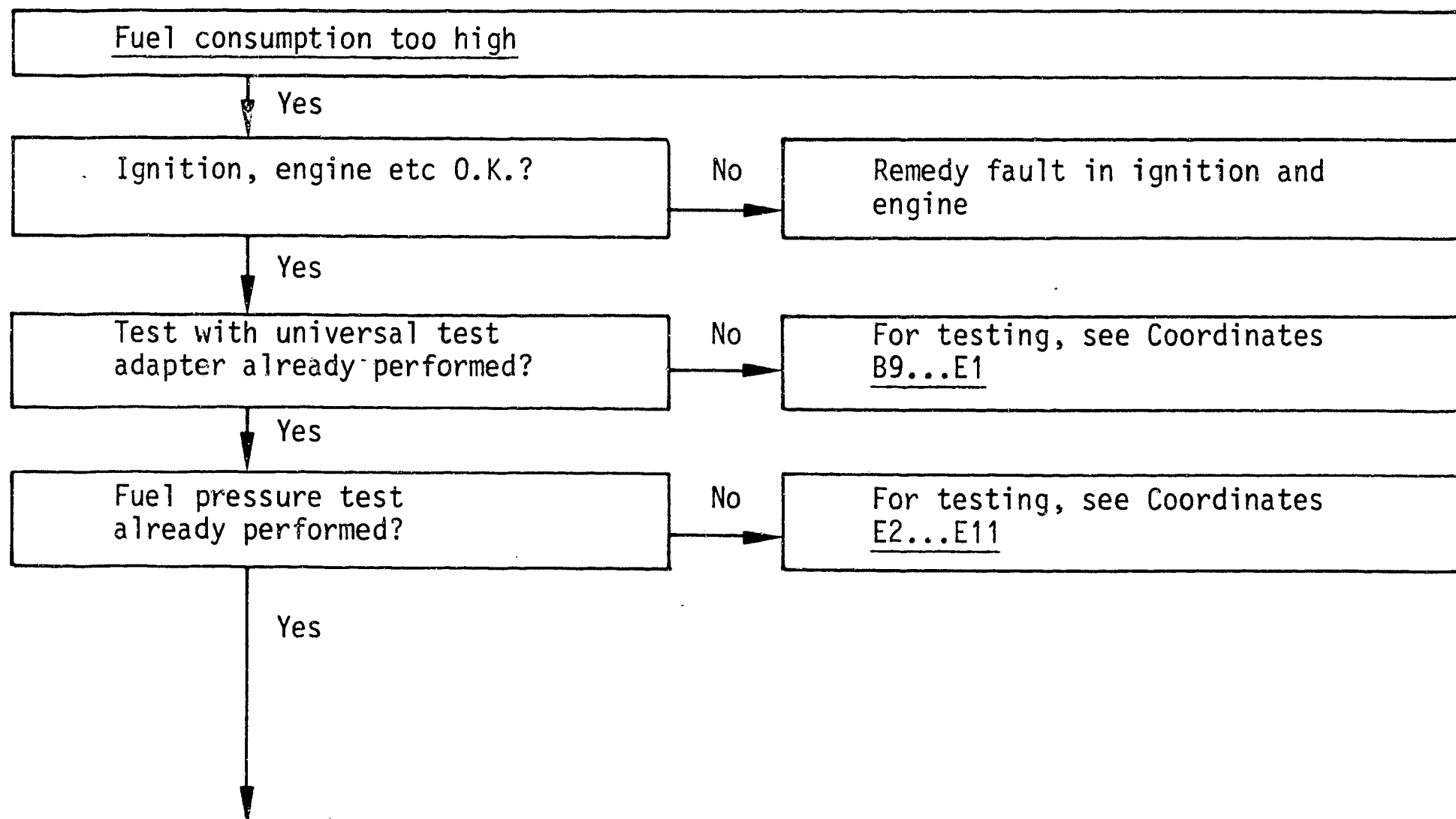
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2. The middle row contains descriptions of the testing and adjustment operations on the components.
3. The right-hand row contains the illustrations belonging to the text and explains the illustrations.

If the questions can be answered conclusively with "yes" without testing, proceed to the next question below.

If, on the other hand, the answer to the question is "no", and you suspect a fault, branch to the middle row of boxes and carry out the tests given there.

When you have finished testing continue trouble-shooting at the point at which you branched off.



Continued on J17/J18

J15

Fuel consumption too high
BMW 5, 6 and 7 series



J16

Fuel consumption too high
BMW 5, 6 and 7 series



Fuel consumption too high (Continued)

Have all brakes released fully?

Yes

Start valve O.K.?

No

Yes

Continued on J19/J20

Testing the start valve for leaks:

1. When installed:

Pinch off the fuel delivery line to the start valve. If engine then runs smoothly, replace start valve.

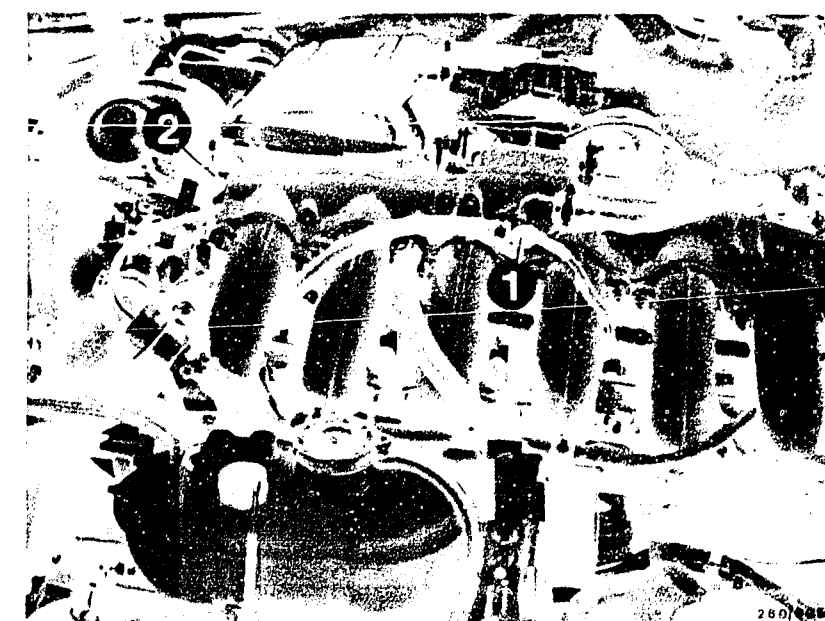
2. When removed:

Remove start valve (caution! fire hazard!). Fuel line and electric lead remain connected (place collector vessel under the start valve). Build up fuel pressure (unscrew hose between air filter and air-flow sensor. Ignition "ON" and deflect air-flow sensor flap).

Test specification: Within one minute max. 1 drop may form at the mouth of the valve.

Caution!

After testing is completed, refit the hose between air filter and air-flow sensor.



1 = Start valve

2 = Thermo-time switch

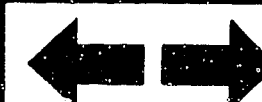
J17

Fuel consumption too high
BMW 5, 6 and 7 series



J18

Fuel consumption too high
BMW 5, 6 and 7 series



Fuel consumption too high (Continued)

Temperature sensors tested?

No

Testing:

Temperature sensor I measures the intake air temperature and is located in the air duct of the air-flow sensor. Measure the following values between term. 27 and term. 6 of air-flow sensor.
At ambient temperature (approx. +15°...+30°C): 1.45...3.3kΩ

Make direct resistance measurement at temperature sensor II (engine) using ohmmeter. Resistance measurement at term. 13 and term. 49 (ground):

1. At ambient temperature (approx. +15°...+30°C): 1.30...3.6kΩ
2. With engine at normal operating temperature (approx. +80°C): 250...390 Ω

If incorrect, check for open circuit or short circuit in following leads using ohmmeter:

Temperature sensor I:

From multiple plug term. 27 to air-flow sensor term. 27 and from air-flow sensor term. 6 to multiple plug term. 6.

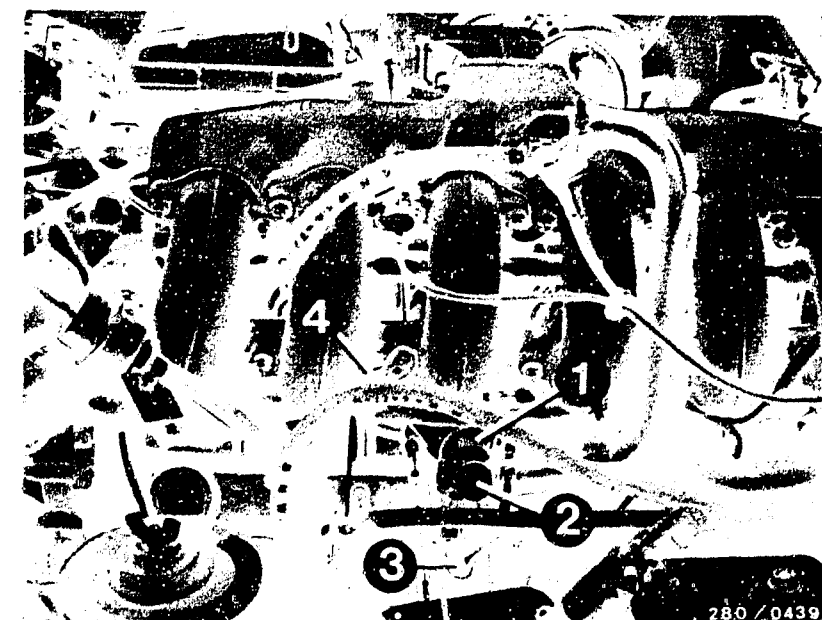
Temperature sensor II:

From multiple plug term. 13 to temperature sensor II term. 13, from temperature sensor II term. 49 to central ground (lead 49).

Check all contacts in the plug-in connections.

Yes

Continued in J21/J22

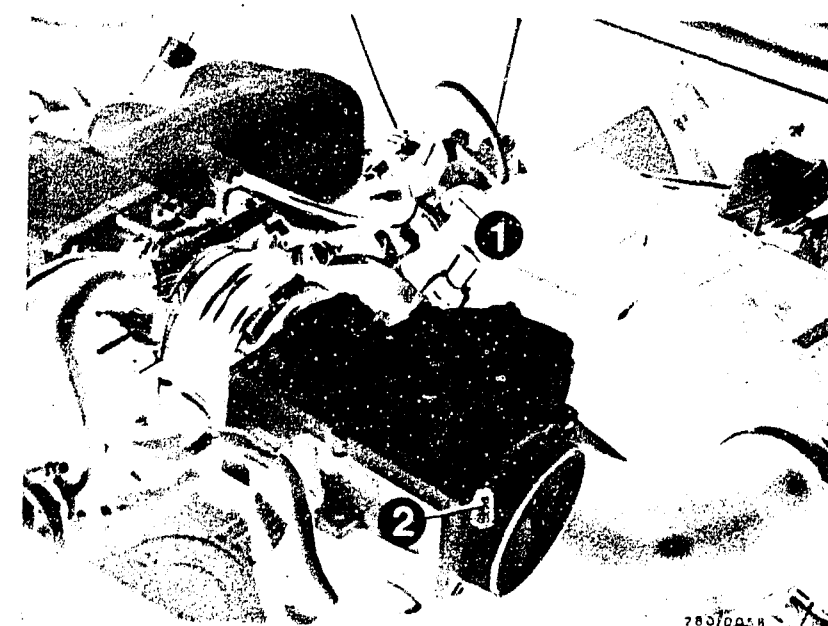


Up to 7.79 model

- 1 = Temperature sensor
- 2 = Auxiliary-air device
- 3 = Thermo-time switch
- 4 = Ground lead from auxiliary-air device to ram pipe

As of 8.79 model

- 1 = Temperature sensor II
- 2 = Temperature sensor I in air-flow sensor (intake duct)



J19

Fuel consumption too high
BMW 5, 6 and 7 series



J20

Fuel consumption too high
BMW 5, 6 and 7 series



Fuel consumption too high (Continued)

Solenoid-operated
injection valves
mechanically O.K.?

Yes

No

With the engine running, disconnect the injection valve connectors individually, one after the other, from the injection valves and plug on again. Engine speed must drop if injection valve is O.K. Test for continuity in connecting leads of relay set term. 88b and term. 88e via the injection valves to control unit term. 14, 15, 30, 31, 32 and 33. If necessary, replace leads or solenoid-operated injection valves.

Air-flow sensor O.K.?

Yes

No

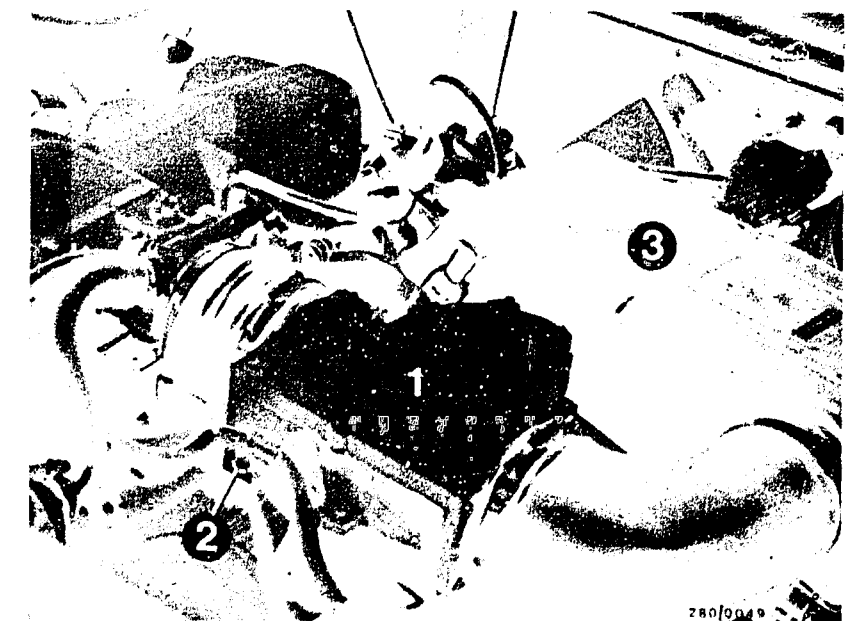
Testing:

Unscrew hose between air filter and air-flow sensor. Open air-flow sensor flap by hand. It must be possible to open the air-flow sensor flap with uniform ease from its fully closed position to its fully open position. When released, the flap must close completely by itself. When the air-flow sensor flap is opened it must not catch at any point. Watch for any indications of abrasion or rubbing. Clean air-flow sensor if the inside is very dirty and rub out with a lint-free cloth. If there are any signs of abrasion or rubbing, replace the air-flow sensor. Connect ohmmeter to term. 7 and term. 8 of air-flow sensor. Deflect air-flow sensor flap.

Test specification: $100...500\ \Omega$
as of FD 049: $200...1000\ \Omega$

Caution!

After testing is completed, refit hose between air filter and air-flow sensor.



1 = Air-flow sensor

Continued on J23/J24

J21

Fuel consumption too high
BMW 5, 6 and 7 series



J22

Fuel consumption too high
BMW 5, 6 and 7 series



Fuel consumption too high (Continued)

CO and idle speed
correctly adjusted?

No

CO and idle adjustment

Exhaust-gas test with CO analyzer
with engine at normal operating tem-
perature and at idle speed.

Idle speed

Manually-shifted transmission and
automatic transmission (selector
lever in position P):

850...950 min⁻¹

CO setting

Test specification:

0.5...2.0 % by vol. CO

Sweden version with
secondary air:

0.3...0.5 % by vol. CO

If CO concentration too high, turn
bypass screw (CO adjusting screw) in
air-flow sensor half a turn in a
counterclockwise direction. Check
engine speed and CO concentration
again. Carry out adjustments in
several steps. After adjusting, use
new plugs.

Yes

Can idle speed not be
adjusted?

Yes

Leak test performed at valve cover,
engine-oil filler neck and oil dipstick?

Yes

Testing completed for
customer complaint

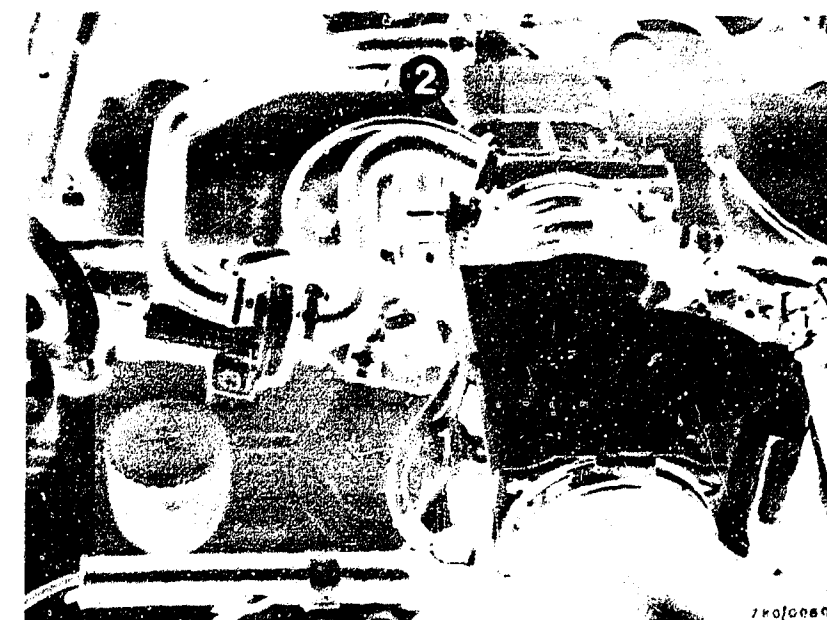
"Fuel consumption too high"

Customer complaint
remedied?

No

Further possibilities:

- Customer complaint incorrectly
diagnosed (see Coordinates B3...
B8). If the fault has not been
detected by "direct trouble-
shooting", see "detailed trouble-
shooting" (Coordinate B3/B4).
- Engine not mechanically O.K.
(Compression, valve setting, valve
timing, worn camshaft).



1 = CO adjusting screw

2 = Idle-speed-adjusting screw



Trouble-shooting program according to customer complaints

How to use the following trouble-shooting program

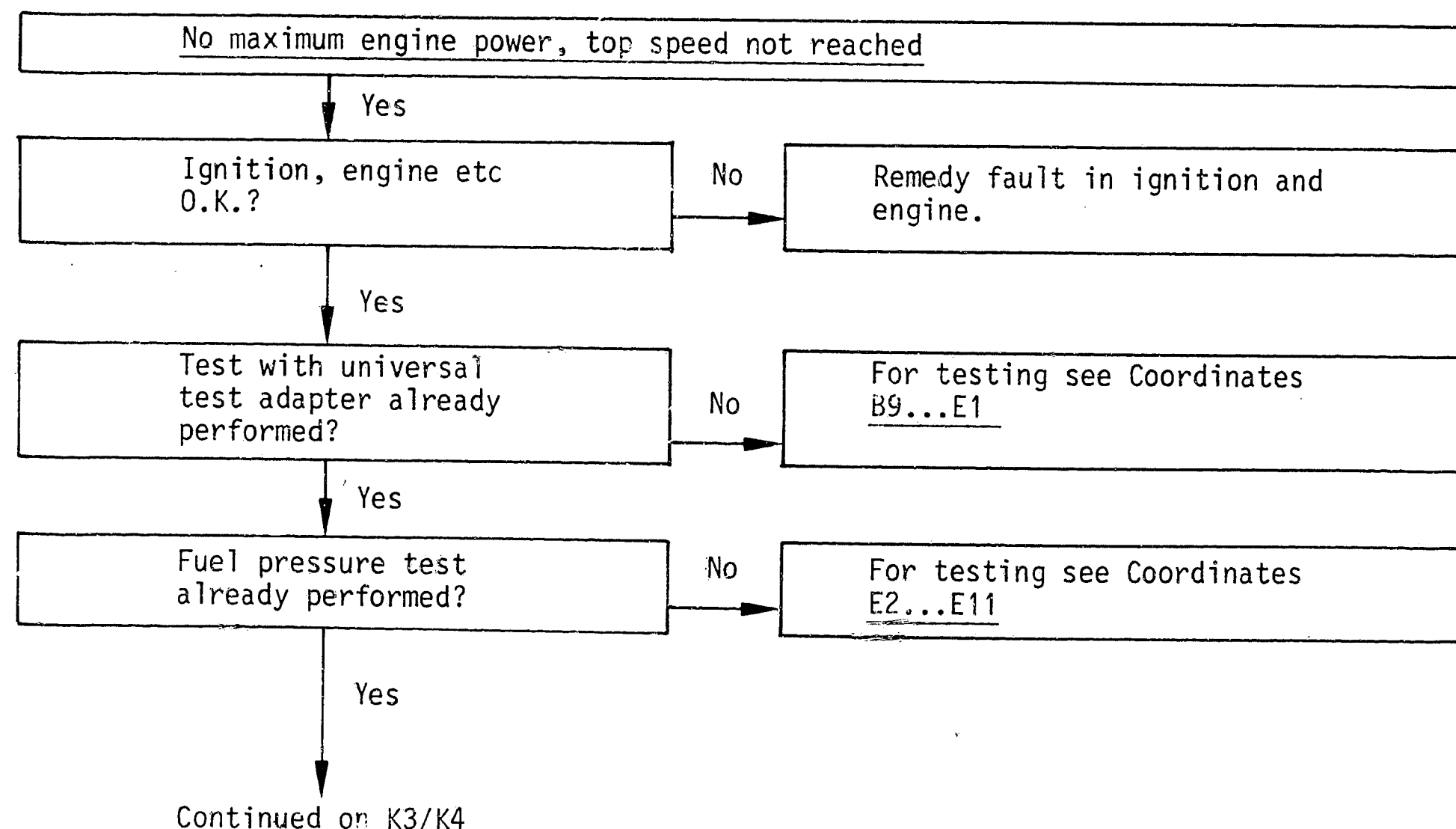
The program is divided into three rows of boxes:

1. The left-hand row contains the questions on the tests.
2. The middle row contains descriptions of the testing and adjustment operations on the components.
3. The right-hand row contains the illustrations belonging to the text and explains the illustrations.

If the questions can be answered conclusively with "yes" without testing, proceed to the next question below.

If, on the other hand, the answer to the question is "no", and you suspect a fault, branch to the middle row of boxes and carry out the tests given there.

When you have finished testing continue trouble-shooting at the point at which you branched off.



K1

No maximum engine power
BMW 5, 6 and 7 series



K2

No maximum engine power
BMW 5, 6 and 7 series



No maximum engine power, top speed not reached (Continued)

Throttle-valve switch O.K.?
(Full-load enrichment)

No

Connect test lead as follows: The two-pole plug connectors of the test lead are connected between an injection valve and its connecting lead. Of the other two terminals of the test lead, only one must be connected to the special input of the motor-tester.

Caution!

The other terminal must not come into contact with vehicle ground.

When the correct terminal is connected, the diagram shown opposite is visible. Using the test lead, the injection valves can be tested with an ignition oscilloscope with the engine running.

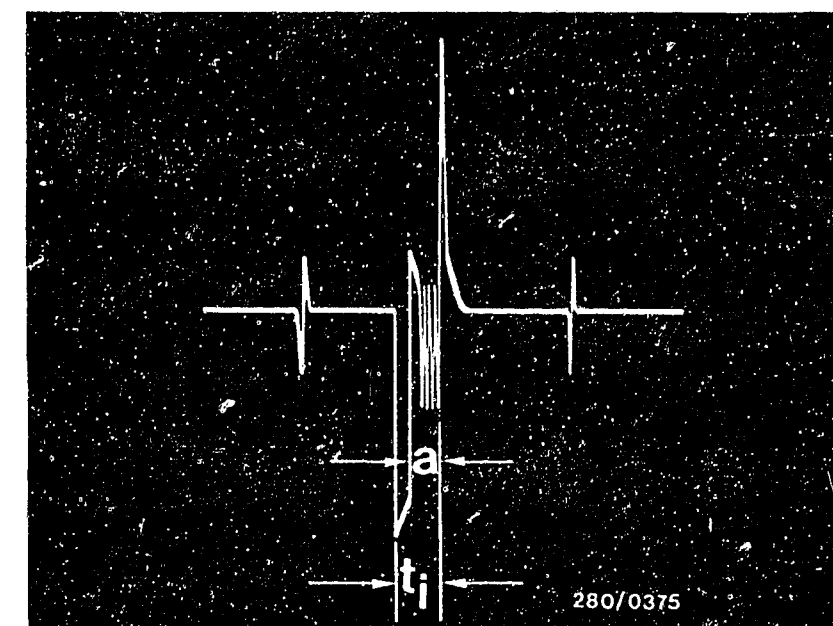
Observe the injection pulses at idle. Remove the throttle-valve switch plug and bridge term. 3 and term. 18 (using insulated wire).

Caution!

Do not bend terminals. Injection pulse must become longer. If not: Test connecting leads from multiple plug to throttle-valve switch (term. 3 and term. 18) for continuity. If O.K., replace control unit.

Yes

Continued on K5/K6



Injection pulse of a current-regulated output stage (measured at injection valve)

a = Length of regulation
 t_i = Injection pulse

At idle with no load on engine "a" is not yet visible on the oscilloscope.

K3

No maximum engine power
BMW 5, 6 and 7 Series



K4

No maximum engine power
BMW 5, 6 and 7 Series



No maximum engine power, top speed not reached (Continued)

Does throttle-valve
open fully?

No

Throttle linkage, accelerator pedal
O.K.? Straighten linkage if neces-
sary. Throttle linkage may stick
due to floor mat etc.
Check plug-in connection on throttle-
valve switch and control unit.

Testing:

Open the throttle valve fully. (Com-
pletely depress accelerator).
Connect ohmmeter to term. 3 and
term. 18 on throttle-valve switch.
Set value approx. 0 Ω .

If reading differs, replace throttle-
valve switch.

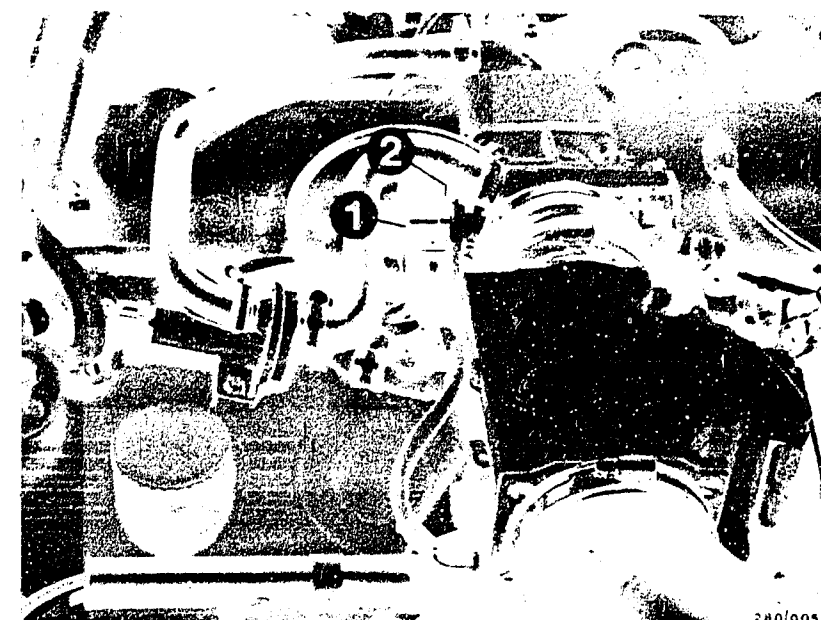
If the fault is still not remedied,
check the following leads for
continuity using ohmmeter.

(Set value approx. 0 Ω):

From throttle-valve switch term. 3 to
control unit term. 3. From throttle-
valve switch term. 18 to control unit
term. 18.

Yes

Continued on K7/K8



1 = Throttle-valve switch
2 = Fastening screws

K5

No maximum engine power
BMW 5, 6 and 7 series



K6

No maximum engine power
BMW 5, 6 and 7 series



No maximum engine power, top speed not reached (Continued)

Fuel delivery O.K.?

No

Measuring the fuel delivery: For testing, undo the junction between the fuel return hose (from pressure regulator) and fuel return line (to fuel tank). If necessary, extend hose and lead into a 5 l vessel with graduated scale. Remove air hose to air filter on air-flow sensor. Ignition "ON". Open air-flow sensor flap by hand until pump operates. Test specification

2.8 l engine: min. 850 cm³/30 s

3.3 l engine: min. 900 cm³/30 s

3.5 l engine: min. 950 cm³/30 s

Remedy if test specification not reached:

- Fuel filter clogged → replace.
- Voltage at fuel pump plugs, with engine running, min. 12 V. If not clean contacts; possibly eliminate poor ground connection or replace leads.
- Fuel pressure regulator defective → replace.
- Fuel pump delivery too low → replace fuel pump.

Caution: After testing is completed, refit hose between air filter and air-flow sensor.

Yes



1 = Pressure regulator
2 = Fuel return hose

Continued on K9/K10

K7

No maximum engine power
BMW 5, 6 and 7 series



K8

No maximum engine power
BMW 5, 6 and 7 series



No maximum engine power, top speed not reached (Continued)

Air-flow sensor O.K.?

No

Testing:

Unscrew hose between air filter and air-flow sensor. Open air-flow sensor flap by hand. It must be possible to open the air-flow sensor flap with uniform ease from its fully closed position to its fully open position. When released, the flap must close completely by itself. When the air-flow sensor flap is opened it must not catch at any point. Watch for any indications of abrasion or rubbing. Clean air-flow sensor if the inside is very dirty and rub out with a lint-free cloth. If there are any signs of abrasion or rubbing, replace the air-flow sensor. Connect ohmmeter to term. 7 and term. 8 of air-flow sensor.

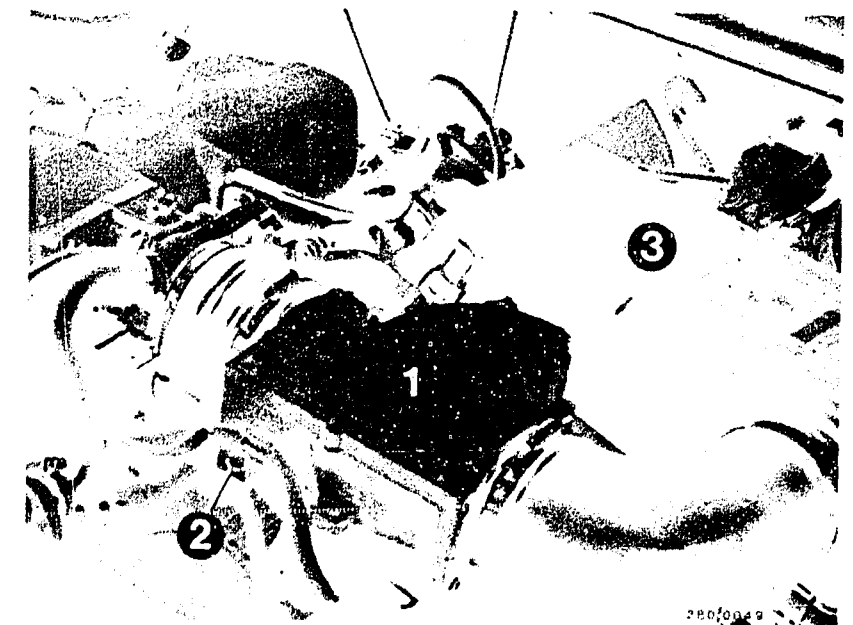
Measure resistance.

Deflect air-flow sensor flap.

Test specification: $100...500\ \Omega$
as of FD 049: $200...1000\ \Omega$

Caution!

After testing is completed, refit hose piece between air filter and air-flow sensor.



1 = Air-flow sensor

Yes

Continued on K11/K12

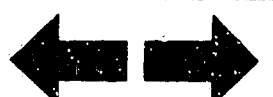
K9

No maximum engine power
BMW 5, 6 and 7 series



K10

No maximum engine power
BMW 5, 6 and 7 series



No maximum engine power, top speed not reached (Continued)

Are all hose lines and electric leads securely connected?
Visual examination. Is the air-intake system leak-tight?

No

Check whether hoses of intake-air system and of fuel line system are correctly attached, not kinked or damaged. If necessary, replace hoses. Eliminate leaks by using new seals or by retightening the connecting screws.

Checking for leaks:

Seal off the exhaust tail pipe. Screw off hose from air filter to air-flow sensor on air-flow sensor and seal off air-flow sensor duct. Pull off hose after auxiliary-air device and blow air (0.3 bar) into the intake manifold with a compressed-air gun. Seal off the connection port on the auxiliary-air device. Open the throttle valve fully. Brush or spray all joints with soapy water. Bubbling or foaming indicates a leak. Check electric contacts for loose contacts.

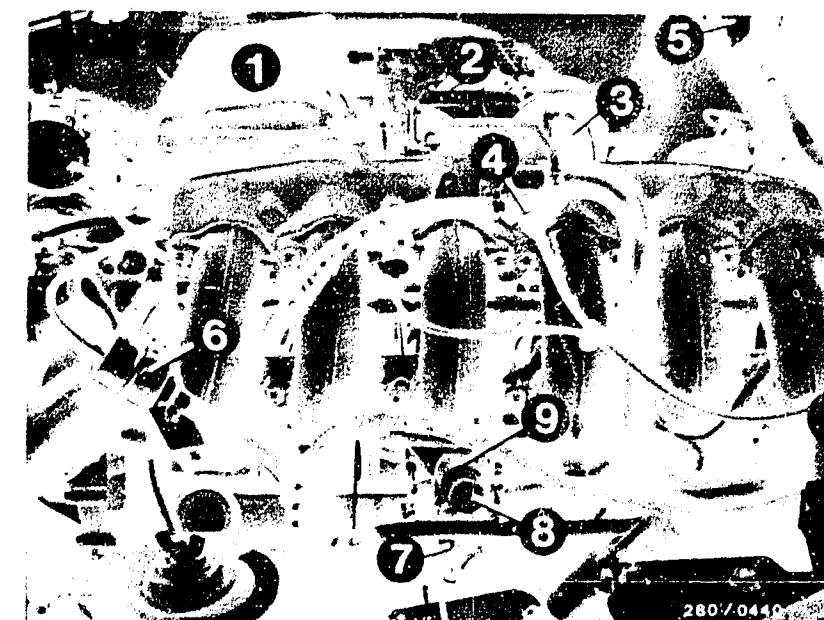
Yes

Testing completed for customer complaint
"No maximum engine power"
Customer complaint remedied?

No

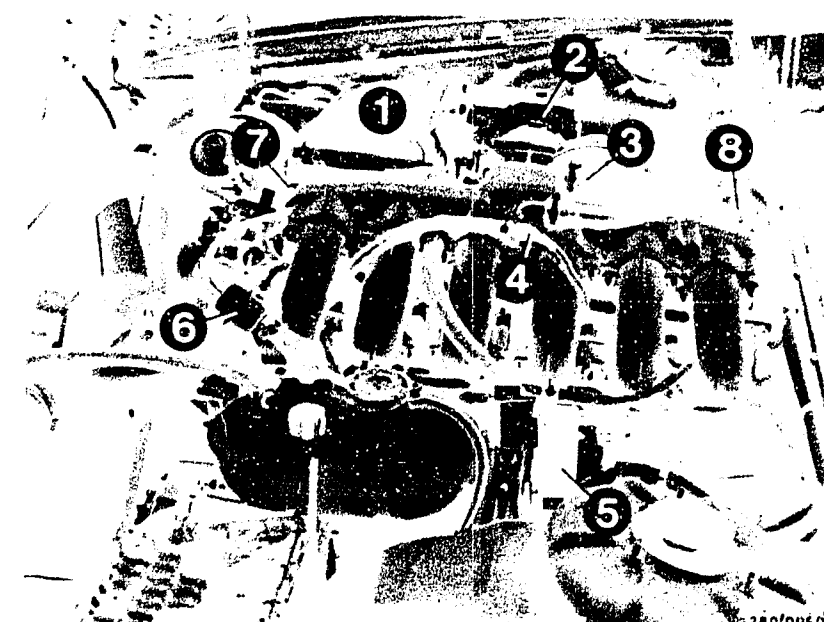
Further possibilities:

- Customer complaint incorrectly diagnosed (see Coordinates B3... B8)
If the fault has not been detected by "direct trouble-shooting", see "detailed trouble-shooting" (Coordinate B3/B4).
- Engine not mechanically O.K. (Compression, valve setting, valve timing, worn camshaft).



Up to 7.1979 model

- 1 = Air filter
 - 2 = Air-flow sensor
 - 3 = Throttle-valve switch
 - 4 = Start valve
 - 5 = Relay set
 - 6 = Pressure regulator
 - 7 = Thermo-time switch
 - 8 = Auxiliary-air device
 - 9 = Temperature sensor II (engine)
- As of 8.1979 model



K11

No maximum engine power
BMW 5, 6 and 7 series



K12

No maximum engine power
BMW 5, 6 and 7 series



Trouble-shooting program according to customer complaints

How to use the following trouble-shooting program

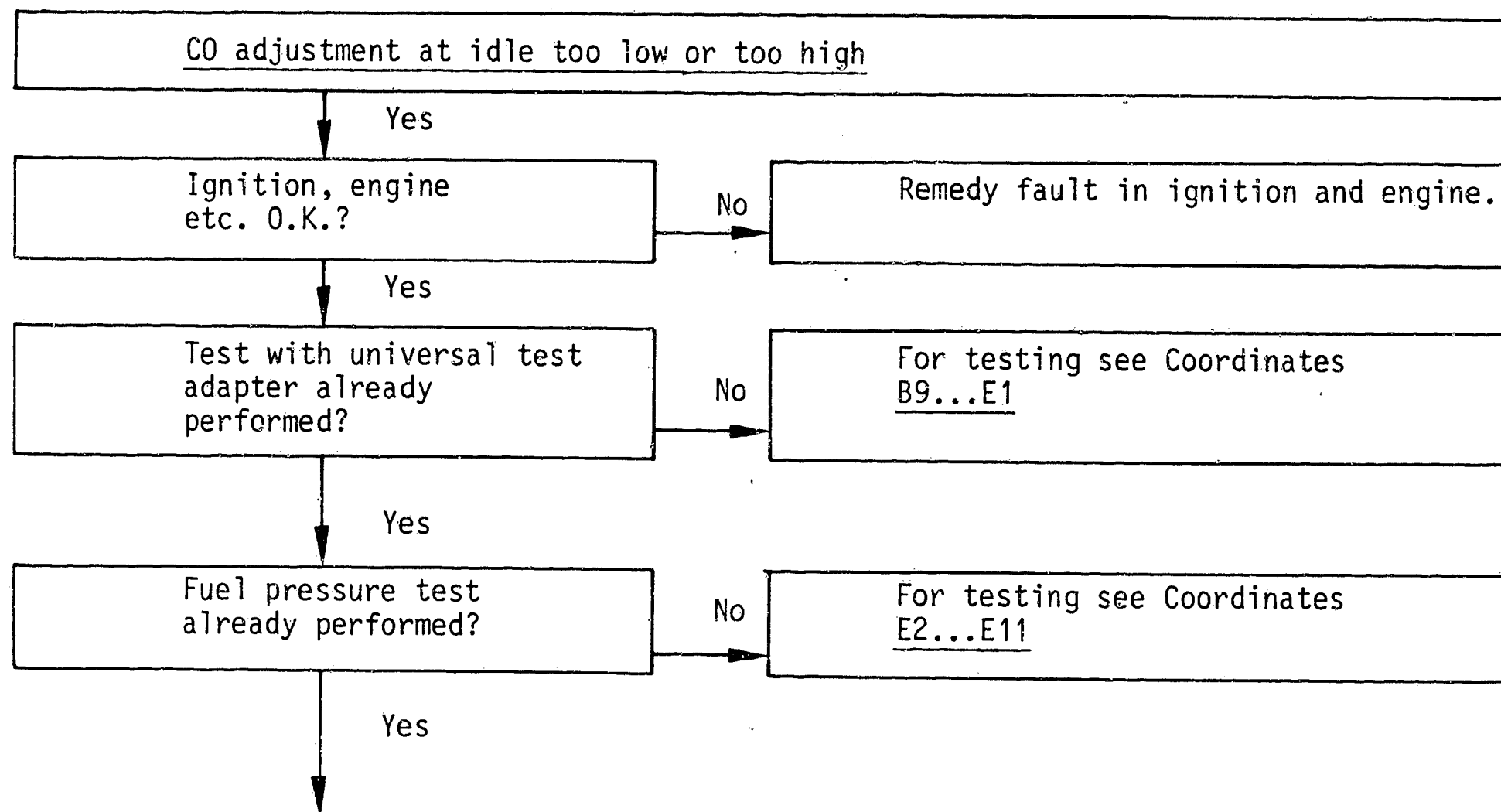
The program is divided into three rows of boxes:

1. The left-hand row contains the questions on the tests.
2. The middle row contains descriptions of the testing and adjustment operations on the components.
3. The right-hand row contains the illustrations belonging to the text and explains the illustrations.

If the questions can be answered conclusively with "yes" without testing, proceed to the next question below.

If, on the other hand, the answer to the question is "no", and you suspect a fault, branch to the middle row of boxes and carry out the tests given there.

When you have finished testing continue trouble-shooting at the point at which you branched off.



Continued on K15/K16

K13

CO adjustment
BMW 5, 6 and 7 series



K14

CO adjustment
BMW 5, 6 and 7 series



CO adjustment at idle too low or too high (Continued)

CO and idle speed
correctly adjusted?

No

CO and idle adjustment

Exhaust-gas test with CO analyzer
with engine at normal operating tem-
perature and at idle speed.

Idle speed

Manually-shifted transmission and
automatic transmission (selector-
lever position P): $850 \dots 950 \text{ min}^{-1}$

CO setting

Test specification:

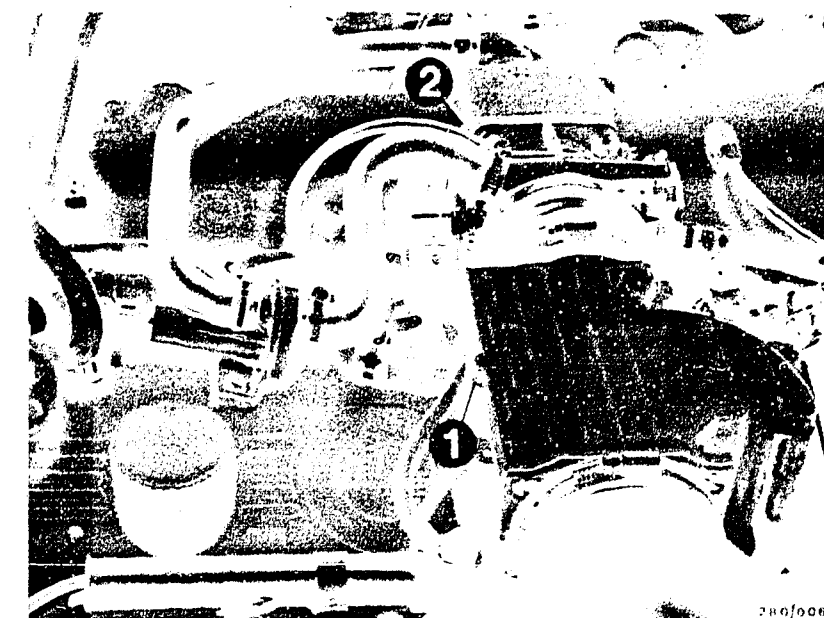
$0.5 \dots 2.0 \text{ \% by vol. CO}$

Sweden version with

secondary air:

$0.3 \dots 0.5 \text{ \% by vol. CO}$

If CO concentration too high, turn
bypass screw (CO adjusting screw) in
air-flow sensor half a turn in a
counterclockwise direction. Check
engine speed and CO concentration
again. Carry out adjustments in
several steps. After adjusting, use
new plugs.



1 = CO adjusting screw

2 = Idle-speed adjusting screw

Can idle speed not
be adjusted?

Yes

Leak test performed at valve cover,
engine-oil filler neck and oil dipstick?

Yes

Continued on K17/K18

K15

CO adjustment

BMW 5, 6 and 7 series



K16

CO adjustment

BMW 5, 6 and 7 series



CO adjustment at idle too low or too high (Continued)

Air-flow sensor O.K.?

No

Testing:

Unscrew hose between air filter and air-flow sensor. Open air-flow sensor flap by hand. It must be possible to open the air-flow sensor flap with uniform ease from its fully closed position to its fully open position. When released, the flap must close completely by itself. When the air-flow sensor flap is opened it must not catch at any point. Watch for any indications of abrasion or rubbing. Clean air-flow sensor if the inside is very dirty and rub out with a lint-free cloth. If there are any signs of abrasion or rubbing, replace the air-flow sensor. Connect ohmmeter to term. 7 and term. 8 of air-flow sensor. Measure resistance.

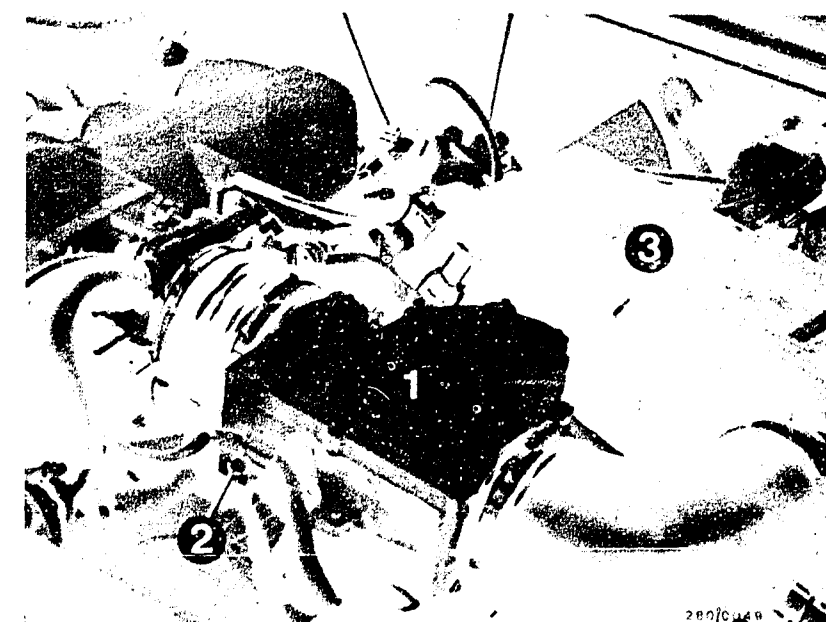
Deflect air-flow sensor flap.

Test specification $100...500\ \Omega$
as of FD 049: $200...1000\ \Omega$

Caution!

After testing is completed, refit hose between air filter and air-flow sensor.

Yes



1 = Air-flow sensor

Continued on K19/K20

K17

CO adjustment

BMW 5, 6 and 7 series



K18

CO adjustment

BMW 5, 6 and 7 series



CO adjustment at idle too low or too high (Continued)

CO concentration below tolerance?

max. 2.0 % by vol. CO

Temperature sensors O.K.?

Start valve O.K.
(Not leaking)

No

Testing the temperature sensors

Make direct resistance measurement at temperature sensor II (engine) using ohmmeter.

Resistance measurement at term. 13 and term. 49 (ground) at:

1. Ambient temperature (approx. +15°...+30°C): 1.3...3.6 k Ω
2. Engine at normal operating temperature (approx. +80°C): 250...390 Ω

If incorrect, check the following leads for open circuit/short circuit using ohmmeter:

From multiple plug term. 13 to temperature sensor II term. 13. From temperature sensor II term. 49 to central ground (lead 49).

Check all contacts in the plug connectors.

Testing the start valve for leaks:

1. When installed:

Pinch off the fuel delivery line to the start valve. If engine then runs smoothly, replace start valve.

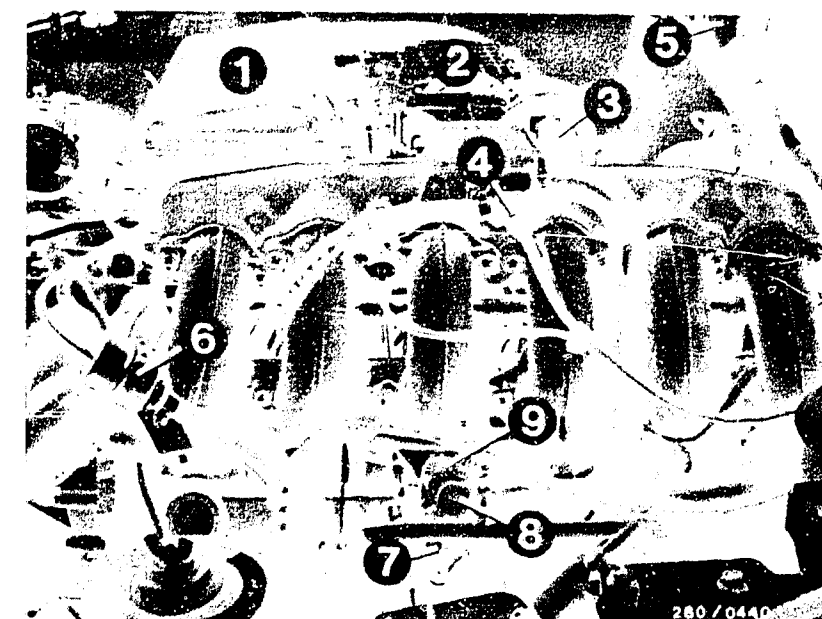
2. When removed:

Remove start valve (caution! fire hazard!).

Fuel line and electric lead remain connected (place collector vessel under the start valve). Build up fuel pressure (unscrew hose between air filter and air-flow sensor. Ignition "ON" and deflect air-flow sensor flap).

Yes

Continued on K21/K22



Up to 7.79:

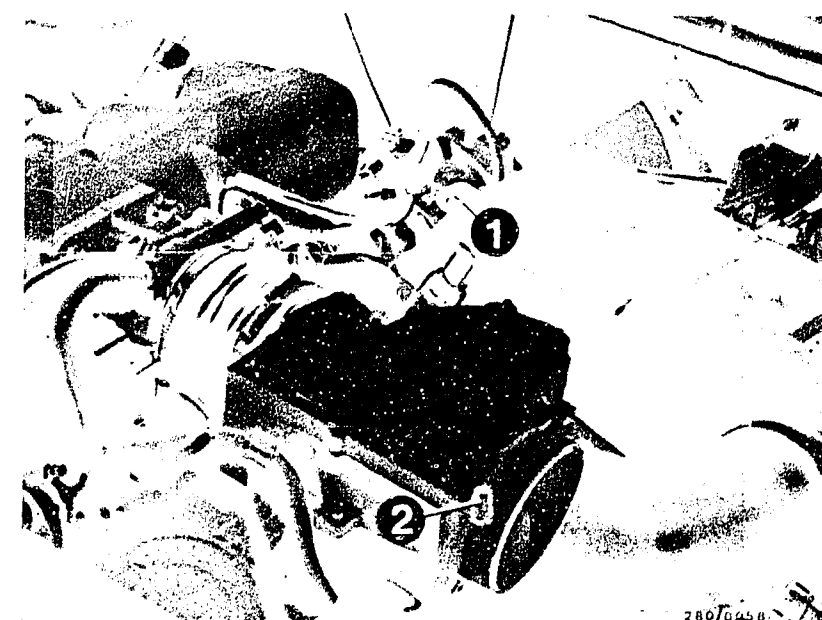
4 = Start valve

9 = Temperature sensor II (engine)

As of 8.79 model:

1 = Temperature sensor II

2 = Temperature sensor I in air-flow sensor (air-intake duct)



K19

CO adjustment

BMW 5, 6 and 7 series



K20

CO adjustment

BMW 5, 6 and 7 series



CO adjustment at idle too low or too high (Continued)

CO concentration above
0.5 % by vol.?

Air-intake system
leak-tight?

Yes

Testing completed
for customer complaint

"CO adjustment"

Customer complaint
remedied?

No

Test specification:

Within one minute max. 1 drop may
form at the mouth of the valve.
Caution! After testing is com-
pleted, refit the hose between air
filter and air-flow sensor.

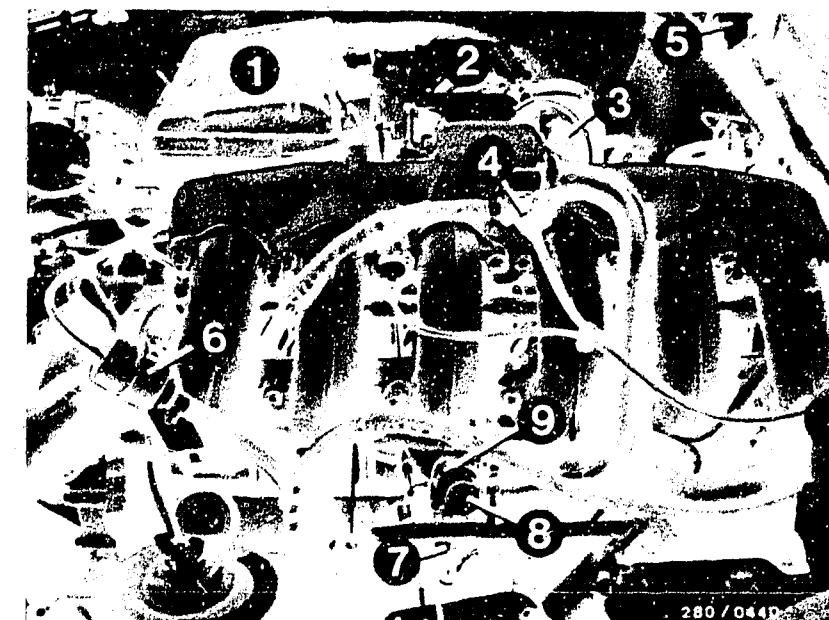
Checking for leaks:

Seal off the exhaust tail pipe.
Screw off hose from air filter to
air-flow sensor duct. Pull off hose
after auxiliary-air device and blow
air (0.3 bar) into the intake mani-
fold with a compressed-air gun. Seal
off the connection port on the
auxiliary-air device. Open the
throttle valve fully. Brush or spray
all joints with soapy water.
Bubbling or foaming indicates a leak.

No

Further possibilities

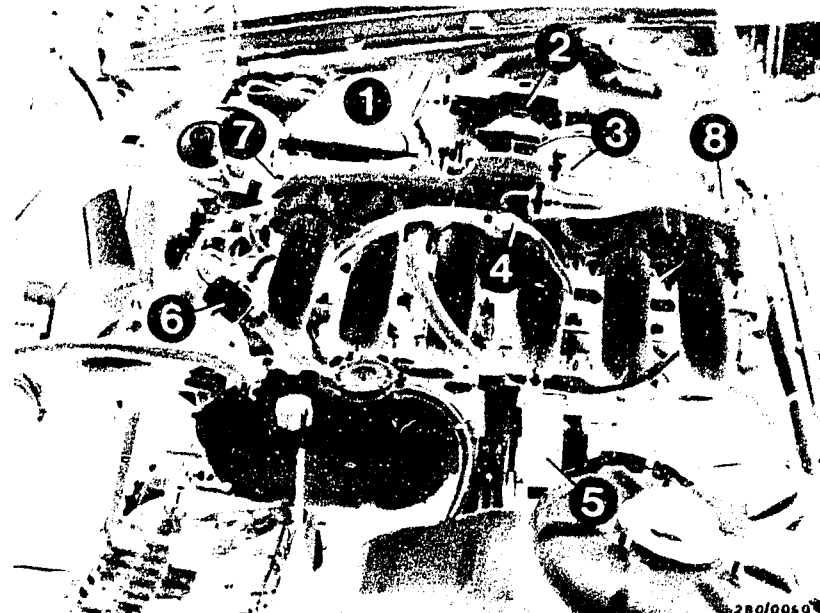
- Customer complaint incorrectly
diagnosed (see Coordinates B3...
B8). If the fault has not been
detected by "direct trouble-
shooting", see "detailed trouble-
shooting" (Coordinate B3/B4).
- Engine not mechanically O.K.
(Compression, valve setting, valve
timing, worn camshaft).



Up to 7.1979 model:

- 1 = Air filter
- 2 = Air-flow sensor
- 3 = Throttle-valve switch
- 4 = Start valve
- 5 = Relay set
- 6 = Pressure regulator
- 7 = Thermo-time switch
- 8 = Auxiliary-air device
- 9 = Temperature sensor II
(engine)

As of 8.1979 model:



K21

CO adjustment
BMW 5, 6 and 7 series



K22

CO adjustment
BMW 5, 6 and 7 series



After-sales Service

Motor Vehicle Service Information

Only for use within the Bosch organization. Not to be communicated to any third party.

UNIVERSAL TEST ADAPTER

VDT-I-Gen. 1001 En
1.1982

1. Application

The multiplicity of different fuel-injection and ignition systems at present available on the market, as well as the advances in development which can be expected in the future, demand a new testing concept. In order to maintain the outlay for test equipment, and hence the costs, at a reasonable limit we have developed the universal test adapter.

The following systems can be tested using a test-adapter universal unit together with adapter leads suited to the system in question:

1.1 Systems which are already being fitted as series:

- L-Jetronic (1st generation)
- LE-Jetronic (2nd-generation L-Jetronic)
- Motronic (with the new connector designation, refer to the vehicle-specific instructions!)

1.2 Systems whose introduction is planned:

- Motronic with gearbox control
- KE-Jetronic
- Mono-Jetronic
- Electronic ignition system with ignition map (EZF)

2. Delivery dates and Part Numbers

Available as from 2.1982.

2.1 Universal test adapter (basic unit)

Part Number. 0 684 101 801

Designation: ETT 013.01

2.2 System adapter lead for LE-Jetronic (2nd-generation L-Jetronic)

Part Number 1 684 463 123

First application: For BMW 2.5/2.8 l engines as from 9.1981, and for Opel 2.0 l engines (Manta/Rekord) as from 9.1981.

BOSCH

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L1

Motor Vehicle Service Information

BMW 5, 6 and 7 series



2.3 System adapter lead for Motronic with new connector assignment.

(Refer to the vehicle-related instructions!)

Part Number : 1 684 463 124

First application: Porsche 944 as from series production, BMW as from about 3.1982 (Europe)

2.4 System adapter lead for L-Jetronic (in preparation)

Further system adapter leads will be made available along with the introduction of the new systems as mentioned above.

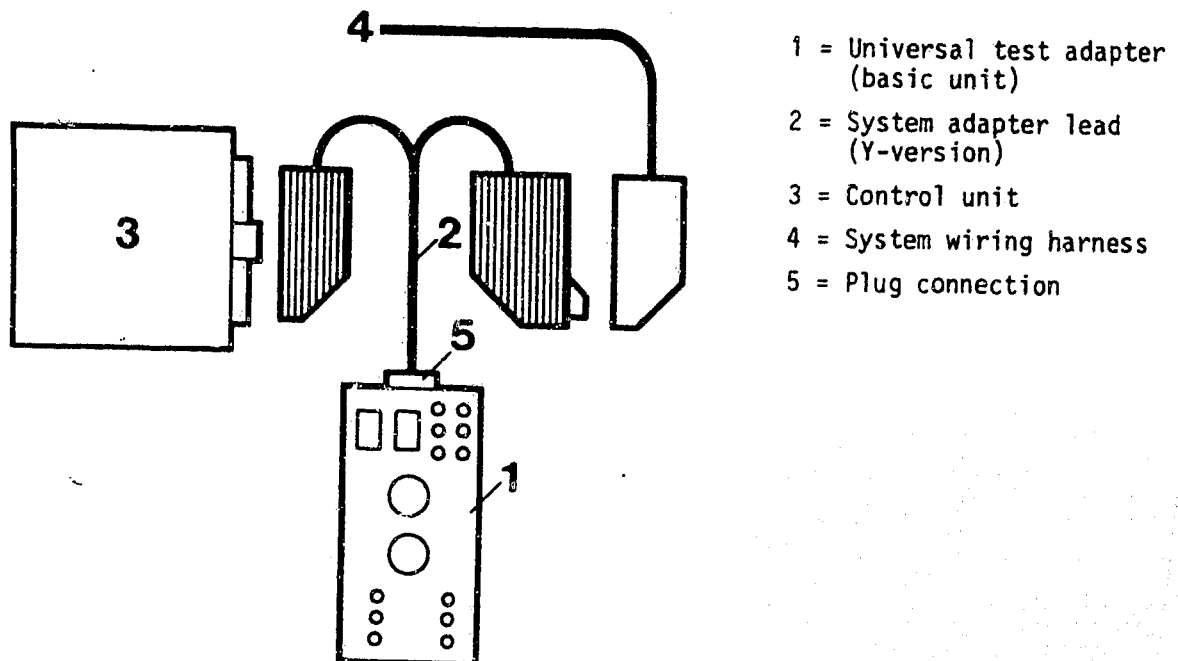
3. Testing procedure

The systems and the components are tested for voltage and resistance values as well as for correct functioning. Evaluation is by means of a multimeter and the Motortester which are connected into the universal test adapter.

Depending upon the complexity of the system, interchangeable adapter lead model 1 or model 2 is provided:

3.1 Adapter lead for peripheral and function testing (Model 1)

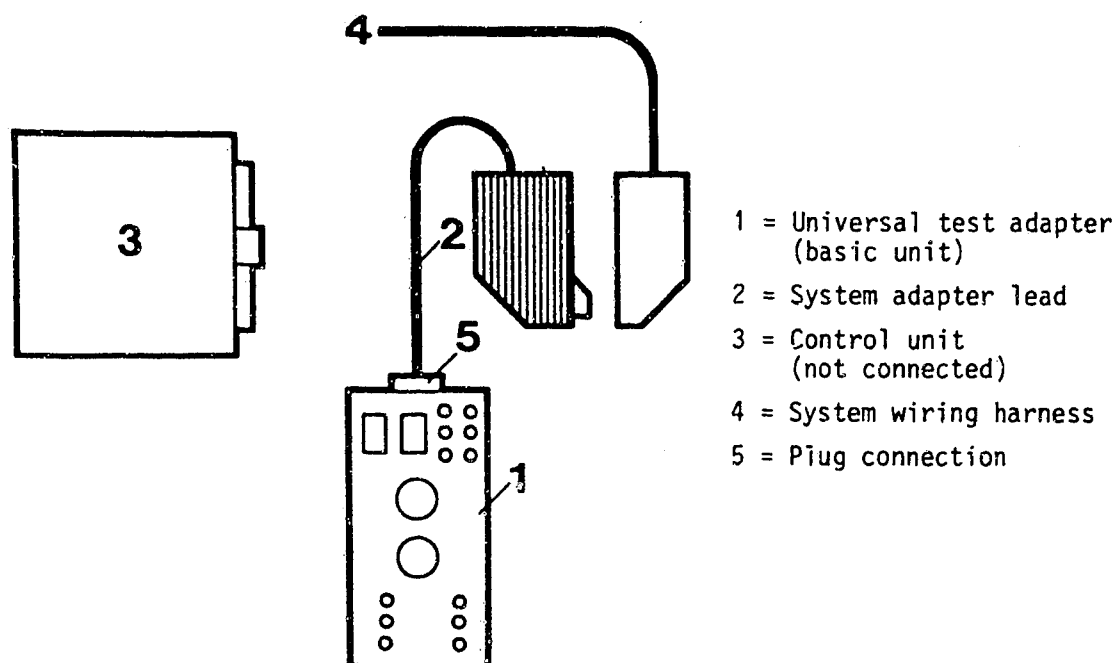
The universal test adapter together with the system adapter lead is to be connected to the system wiring harness and to the control unit (e.g. Motronic).
To be tested: Wiring harness with components and control unit.



3.2 Adapter lead for peripheral testing (Model 2)

The universal test adapter with system adapter lead, is only to be connected to the system wiring harness (e.g. LE-Jetronic (2nd-generation L-Jetronic)).

To be tested: Wiring harness with components (without control unit).

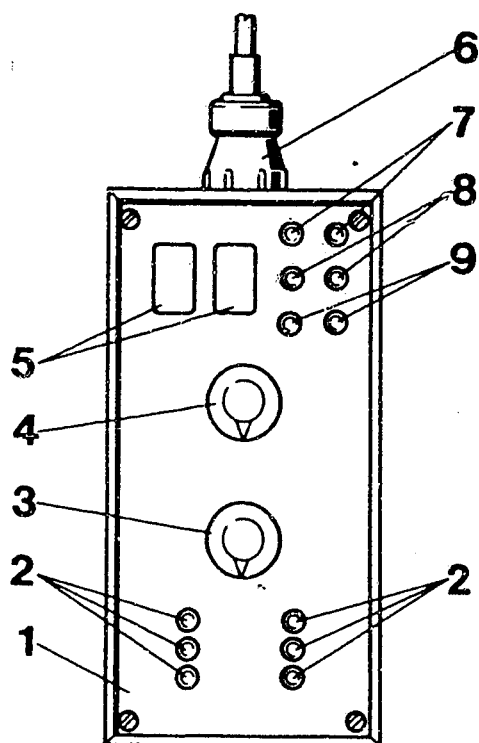


4. Construction of the universal test adapters

The universal test adapter is fitted with 2 program switches footage and resistance measurement. The measured values are displayed on the multimeter connected to the universal test adapter. For reasons of safety, the voltage and resistance sockets are separated. In order to measure signals (e.g. injection pulses, ignition pulses), it is necessary to connect a Motortester to the measuring cavities (special input).

When carrying out functional tests with the control unit connected, selected push-buttons are pressed in a number of test-program steps in order to simulate a variety of different engine operating conditions the influence of which is evaluated using the Motortester.





- 1 = Universal test adapter (basic unit)
- 2 = Keyboard for simulation of various conditions e.g. engine temperature, throttle position etc.
- 3 = Program switch "Ohm" for resistance measurement
- 4 = Program switch "Volt" for voltage measurement
- 5 = Measurement "cavities" (for the special input from the Motortester)
- 6 = 63-pole plug-in connection for connecting the system adapter lead
- 7 = Measurement sockets (voltage measurement with a multimeter or with the Motortester)
- 8 = Measurement sockets (resistance measurement with the multimeter)
- 9 = Sockets for special functions (not yet allocated)

Notes:

1. The Motronic test adapter (0 684 101 800, ETT 018.00) will continue to be used for Motronic-equipped BMW vehicles (with old connector assignment) up to about year of manufacture 3.1982 (refer to vehicle-specific instructions).
2. Details on the operation of the universal test adapter, and the test specs, are to be found in the vehicle-specific after-sales service instructions.

3. Caution! Change of Part Number:

On the SIS-microfiches OPE-00/J22 (Coordinates A14 and A17) the new Part Numbers are as follows:

Universal test adapter: 0 684 101 801

Adapter lead : 1 684 463 123



After-sales Service

Motor Vehicle Service Information

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BMW PASSENGER CARS WITH L-JETRONIC

VDT-I-BMW 027 En

Fuel-pump noise

7.1980

Just lately, in the case of a number of different BMW passenger cars fitted with L-Jetronic, noises have occurred which are very similar to those originating from fuel-supply pumps. This noise though, stems from hydraulic vibrations in the fuel lines when the injection valves inject.

Remedy:

1. Check the routing of the fuel lines from the fuel tank to the engine compartment. They must have no direct contact with the bodywork.
2. Fit a diaphragm damper 0 280 161 006 in the fuel-return line on the fuel-tank side of the pressure regulator. Attach to the bulkhead. If necessary, lengthen the fuel line.

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L5

Motor Vehicle Service Information

BMW 5, 6 and 7 series



After-sales Service

Technical Bulletin

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CAR ALARM II, RETROFITTING
in vehicles equipped with L-Jetronic

VDT-I-280/103 En
7.1981
Supersedes Ed. 9.1980

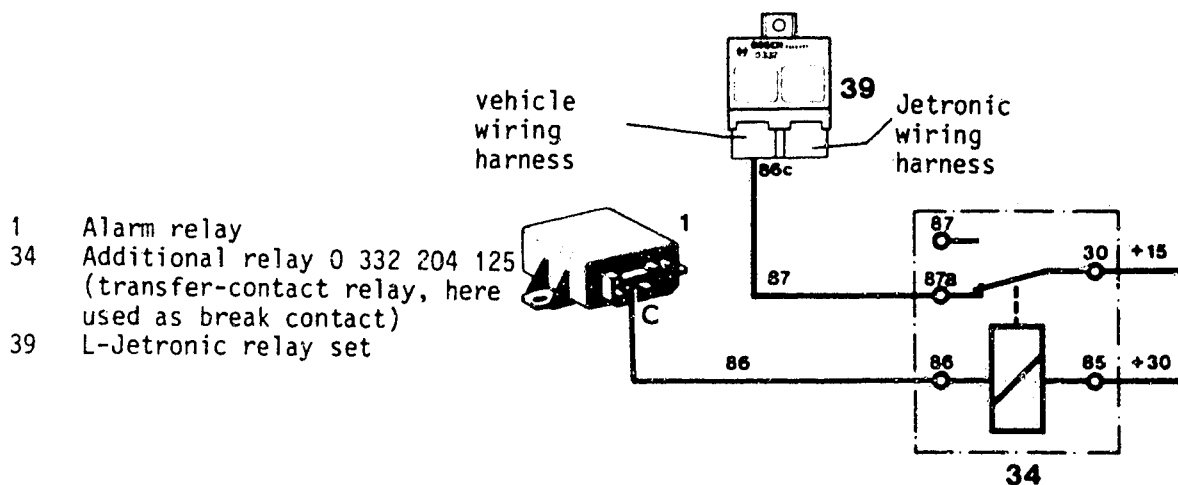
In cases where Car Alarm II (0 335 411 901) is retrofitted in vehicles equipped with L-Jetronic, the terminal 1 of the ignition coil must NOT be connected to terminal "C" of the alarm relay. When the Car Alarm is switched on, terminal "C" of alarm relay is switched internally to vehicle ground. This would mean that when attempts are made to start the vehicle with the alarm switched on, the ignition coil and the L-Jetronic control unit would be destroyed. This also means though, that full protection against theft is no longer possible as would normally be the case with the ignition switched off and with the alarm installation primed.

A circuit has now been developed which ensures complete theft protection for L-Jetronic vehicles as well.

Description of the circuit

Open-circuit the line "15" leading to terminal "86c" of the relay set using an additional relay (34) 0 332 204 125. This relay ensures that when the alarm installation is primed, the supply voltage to the control unit is switched off and hence the control unit no longer functions.

The additional relay (34) 0 332 204 125 is controlled by terminal "C" of the alarm relay (see circuit diagram).



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L6

Technical Bulletin

BMW 5, 6 and 7 series



After-sales Service

Technical Bulletin

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NEW RELAY SET FOR L-JETRONIC

VDT-I-280/104 En

Connection sockets, danger of confusion

9.1980

New relay combinations 0 332 514 121, ..123, ..124, ..125 and ..127 with black plastic housing are being fitted in L-Jetronic equipped vehicles (e.g. BMW and FIAT).

With these new relay combinations, the two connection sockets can be accidentally confused with one another (for instance during test work). The safeguard pin previously fitted in terminal 88f of the Jetronic wiring harness socket of the relay combination 0 332 514 105 has been omitted and replaced by a "genuine" terminal 88f (see Figs. 1 and 2).

Fig. 1

Layout of the conductors in the connection socket of the relay combination 0 332 514 105 (top view)

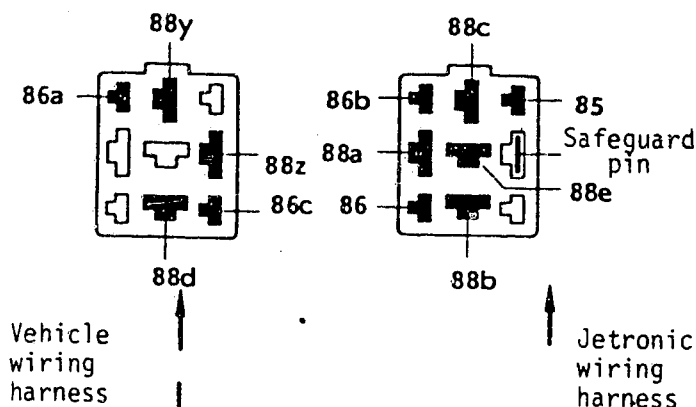
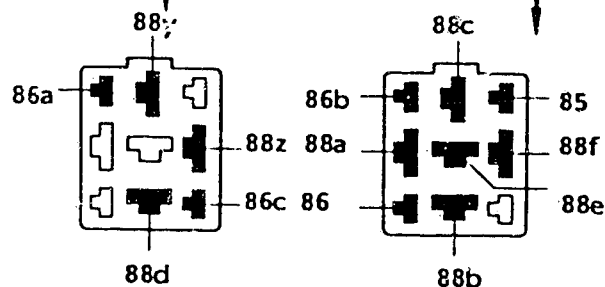


Fig. 2

Layout of the conductors in the connection socket of the relay combinations 0 332 514 121, ..123, ..124, ..125, ..127 (top view)



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BMW 5, 6 and 7 series

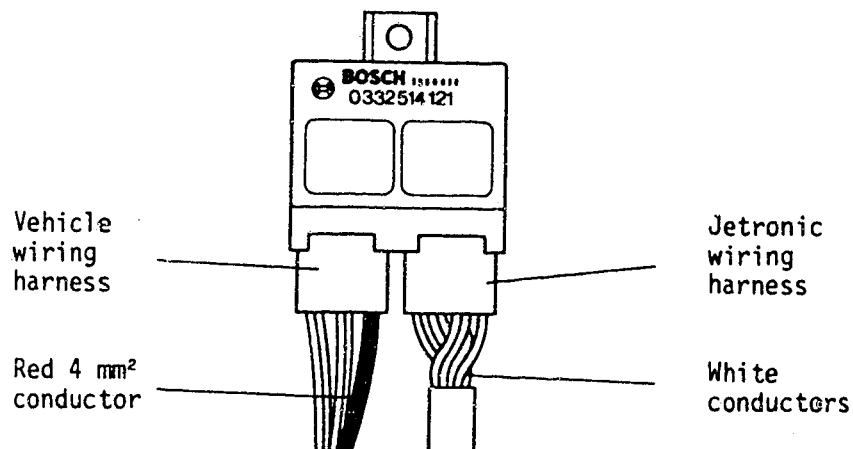


The connection sockets can also be identified in the following manner:

Vehicle wiring harness - connection socket is recognizable by the thick red conductor (4 mm²) leading to terminal 88Z. As viewed from above it is located on the left of the relay combination (see Fig. 3).

Jetronic wiring harness - connection socket is recognized by the white conductors. As viewed from above it is located on the right of the relay combination (see Fig. 3).

Note: With the wiring-harness sockets interchanged, the electric fuel pump starts to run as soon as the ignition is switched on.



With the introduction of the new relay combination, the resistance value between terminal 86b and 85 changes to 70 ... 500 Ω (L-Jetronic Tester, test step 3.1).

When testing with an ohmmeter, observe correct polarity.

Positive pole of the ohmmeter to terminal 86b.



After-sales Service

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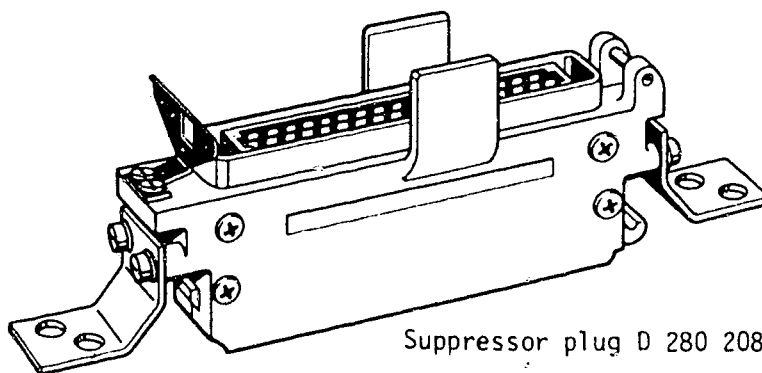
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PERMANENTLY INSTALLED AND PORTABLE TRANSMITTER
INSTALLATIONS FITTED IN VEHICLES EQUIPPED WITH
L-JETRONIC

VDT-I-280/106 En
4.1981

If, in vehicles equipped with L-Jetronic and in which transmitter installations are operated, whether permanently installed or removable and portable, malfunctions occur whilst the vehicle is being driven (the engine shakes or stops etc.), the following measures can be taken to remedy these faults:

- The hinges for the engine hood and the luggage-compartment lid are to be bridged with a flexible copper braided grounding strip (efficient grounding!).
- The antenna base is to be connected to the vehicle chassis using a copper grounding strip to ensure clean, 100% connection.
- Locate the transmitter and its antenna as far away as possible from the L-Jetronic control unit.
- Tune the transmitter to the antenna in order to achieve the minimum reflection coefficient.
- The parallel routing of the cables for the transmitter power supply and the antenna with the L-Jetronic wiring harness is to be avoided (danger of cross-coupling and cross-talk).



Suppressor plug D 280 208 091

If the disturbances and complaints continue even though the above measures have been taken, then the degree of suppression can be improved by incorporating the suppression plug D 280 208 091 between the wiring-harness plug and the L-Jetronic control unit.

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Technical Bulletin

BMW 5, 6 and 7 series



Ordering

REGE/AV is to order direct from KH/VKD2.

Price

Available upon request.



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